Vol. 896 Number 1

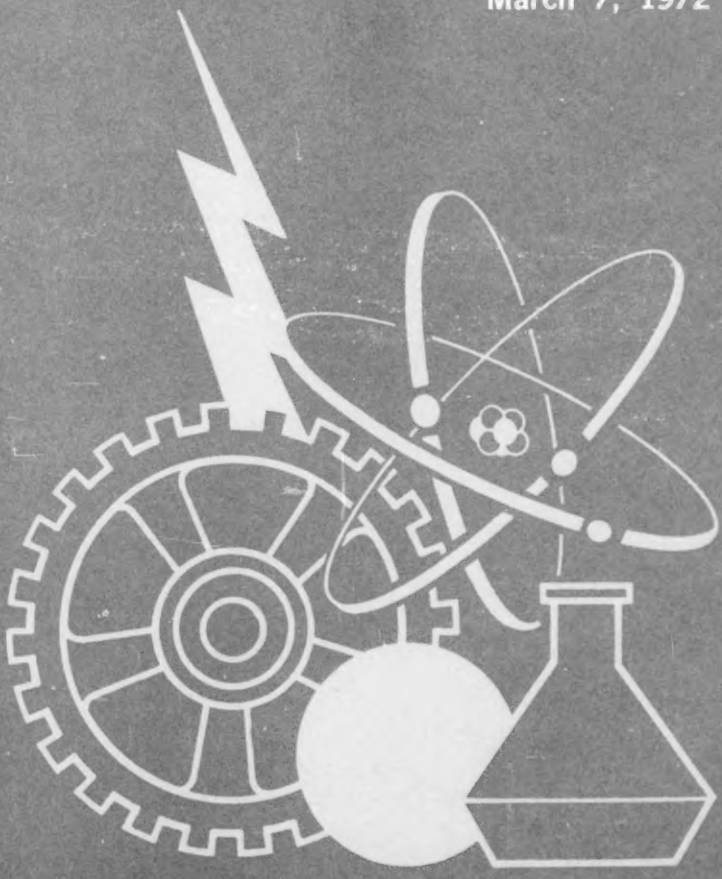
OFFICIAL GAZETTE

of the
UNITED STATES PATENT OFFICE

A UNITED STATES DEPARTMENT OF COMMERCE PUBLICATION

PATENTS

March 7, 1972



U. S. DEPARTMENT OF COMMERCE
Patent Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the UNITED STATES PATENT OFFICE

March 7, 1972 Volume 896 Number 1

CONTENTS

	Page
Issue of March 7, 1972	1
Patents and Trademark Notices	
Title 37—Rules of Practice in Trademark Cases	2
Removal from Register	2
Patent Suits	10
Patent Notices	
Dedications	13
Disclaimers	13
Disclaimers and Dedications	14
Certificates of Correction for the Week of March 7, 1972	14
Condition of Patent Applications	15
Defensive Publications	16
Patents Granted	
General and Mechanical	20
Chemical	205
Electrical	309
Design Patents Granted	405
Index of Patentees	PI 1
Indices of Applicants of Defensive Publications and Designs	PI 52
Classification of	
Patents	PI 55
Designs and Defensive Publications	PI 58
Geographical Index of Residence of Inventors	
Patents	PI 59
Designs and Applicants of Defensive Publications	PI 61

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $89.00 per annum, foreign mailing $22.25 additional; single copies $2.00 each.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $17.00 per annum, foreign mailing $4.25 additional; single copies 40 cents each.

CIRCULARS OF GENERAL INFORMATION concerning PATENTS or TRADEMARKS, price 15 cents each.

PRINTED COPIES OF PATENTS are furnished by the Patent Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS and DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.O.

PATENT OFFICE NOTICES

TITLE 37—PATENTS, TRADEMARKS, AND COPYRIGHTS

Chapter I—Patent Office, Department of Commerce

PART 2—RULES OF PRACTICE IN TRADEMARK CASES

Interferences

A proposal was published at 36 F.R. 18002 to amend, revise, or redesignate §§ 2.27, 2.61, 2.80–2.82, 2.91, 2.92, 2.98, 2.101, and 2.103. Pursuant to this notice, a number of comments have been received from interested persons, and due consideration has been given to all matter presented. Only editorial changes have been made in the rules as proposed.

Effective date. This revision shall become effective on March 1, 1972, and will apply to all applications except those in which a notice of publication was mailed prior to March 1, 1972.

§ 2.27 [*Amended*]

1. Section 2.27 is amended by changing "2.81" in paragraph (b) to read "2.80."

§ 2.61 [*Amended*]

2. Section 2.92(c) is redesignated as § 2.61(c).

3. Section 2.81 is redesignated as § 2.80 and revised to read as follows:

§ 2.80 *Publication for opposition.*

If, on examination or reexamination of an application for registration on the Principal Register, it appears that the applicant is entitled to have his mark registered, the mark will be published in the OFFICIAL GAZETTE for opposition. The mark will also be published in the case of an application to be placed in concurrent use proceedings, if otherwise registrable.

§§ 2.81, 2.82 [*Redesignated*]

4. Sections 2.82 and 2.83 are redesignated as §§ 2.81 and 2.82, respectively.

5. A new § 2.83 is added and reads as follows:

§ 2.83 *Conflicting marks.*

(a) Whenever an application is made for registration of a mark which so resembles another mark or marks pending registration as to be likely to cause confusion or mistake or to deceive, the mark with the earliest effective filing date will be published in the OFFICIAL GAZETTE for opposition if eligible for the Principal Register, or issued a certificate of registration if eligible for the Supplemental Register. A notice will be sent, if practicable, to the applicants involved informing them of the publication or issuance of the earliest filed mark.

(b) In situations in which conflicting applications have the same effective filing date, the application with the earliest date of execution will be published in the OFFICIAL GAZETTE for opposition or issued on the Supplemental Register. A notice will be sent, if practicable, to the applicants involved informing them of the publication or issuance of the application with the earliest date of execution.

(c) Action on the conflicting application which is not published in the OFFICIAL GAZETTE for opposition or not issued on the Supplemental Register will be suspended by the Examiner of Trademarks until the published or issued application is registered or abandoned.

6. The heading for §§ 2.91–2.99 entitled "Interferences" is revised to read "Interferences and Concurrent Use Proceedings."

7. Section 2.91 is revised to read as follows:

§ 2.91 *Interferences.*

(a) An interference will not be declared between two applications or between an application and a registration except upon petition to the Commissioner. Interferences will be declared by the Commissioner only upon a showing of extraordinary circumstances which would result in a party being unduly prejudiced without an interference. In ordinary circumstances, the availability of an opposition or cancellation proceeding to the party will be deemed to remove any undue prejudice.

(b) Registrations and applications to register on the Supplemental Register, registrations under the Act of 1920, and registrations of marks the right to use of which has become incontestable are not subject to interference.

8. Section 2,92 is revised to read as follows:

§ 2.92 *Preliminary to interference.*

Before the declaration of an interference, the marks which are to form the subject matter of the controversy must have been decided to be registrable by each party except for the interfering mark.

9. Section 2.98 is revised to read as follows:

§ 2.98 *Adding party to interference.*

If, during the pendency of an interference, another case appears involving substantially the same registrable subject matter, the Examiner of Trademarks may request the suspension of the interference for the purpose of adding said case. Such suspension will be granted as a matter of course if no testimony has been taken. If any testimony has been taken or is about to be taken, the case will not be added except upon approval of a member of the Trademark Trial and Appeal Board. If the case is not added, the Examiner of Trademarks may suspend action on such case pending termination of the interference proceeding.

§ 2.101 [*Amended*]

10. Section 2.101 is amended by changing "2.81," to read "2.80."

§ 2.103 [*Amended*]

11. Section 2.103 is amended by changing "2.81" in the second sentence to read "2.80."

Dated: February 2, 1972.

ROBERT GOTTSCHALK,
Commissioner of Patents.

Approved:

JAMES H. WAKELIN, JR.,
Assistant Secretary for Science and Technology.

[FR Doc. 72–1863; Filed 2–8–72; 8:46 am]

Pub. 37 F.R. 2880, Feb. 9, 1972

Removal From Register

Pursuant to the provisions of Rule 347 of the Rules of Practice of the United States Patent Office in Patent Cases, a letter was directed on May 15, 1971, to the last post office address furnished to the Committee on Enrollment by each of the persons whose name and address appear on the following list. With respect to some of the letters, no reply was received within the period of forty-five days therein set. Other letters were returned by the Post Office with notations to the effect that the addressee was deceased, unknown, or had moved and left no forwarding address. Accordingly, the names of the following persons are being removed from the Register of Patent Attorneys and Patent Agents.

LUTRELLE F. PARKER,
Feb. 10, 1972. *Chairman, Committee on Enrollment.*

A

Abrams, Morris M., U.S. Office of Education, FOB 6, 400 Maryland Ave. S.W., Washington, D.C. 20202
Achtenberg, Irving, Home Savings Bldg., Suite 1212, Kansas City, Mo. 64106
Ackley, E. Hastings, 707 Wilson Bldg., Dallas, Tex. 75201
Adams, Harold W., 105 W. Washington St., Alexandria, Va. 22314
Adamson, Ernie, 919 Winall Down Rd., Atlanta, Ga. 30319
Addams, Nicholas A., 933 Washington Bldg., 15th and New York Ave., Washington, D.C. 20005
Addison, William G., American Potash & Chemical Corp., 3000 W. 6th St., Los Angeles, Calif. 90054
Ahern, Daniel F., Jr., 337 Fullerton Ave., Newburgh, N.Y. 12553
Alexander, Louis, 7 Fenwood Dr., Old Saybrook, Conn. 06475
Allnutt, Robert F., Communications Satellite Corp., 1900 L St. N.W., Washington, D.C. 20036

A—Continued

Alpher, Robert, Olin Mathieson Chem. Corp., 460 Park Ave., New York, N.Y. 10022
Amann, Rudolf, 75 Federal St., Boston, Mass. 02110
Anderson, John H., 2552 Canterbury Rd., Cleveland Heights., Ohio 44100
Anderson, Theodore W., Jr., 77 W. Washington St., Chicago, Ill. 60602
Angell, Charles H., Hurleton Inc., 1938 E. Fairchild, Danville, Ill. 61832
Anglim, Charles E., Warren Bldg., 166 Santa Clara Ave., Oakland, Calif. 94610
Appleby, Thomas, Sr., 5415 Connecticut Ave., Washington, D.C. 20015
Arnold, Daniel, 6132 31st Pl. N.W., Washington, D.C. 20015
Arnold, Ralph S., Ampex Corp., 401 Broadway, Redwood City, Calif. 94063
Aron, Lewis G., U.S. Army Electronics Command, Bldg. 43, Evans Area Belmar, N.J. 07719
Ashton, Henry R., 277 Park Ave., New York, N.Y. 10017
Astrup, J. Leo, 1441 N. State Pkwy., 3rd Fl., Chicago, Ill. 60600
Atkins, James, 411 Munsey Bldg., Washington, D.C. 20004
Aurich, Alfred C., 1420 P.S.F.S. Bldg., 12 S. 12th St., Philadelphia, Pa. 19107
Ausbeck, Paul J., U.S. Pipe and Foundry Co., 3300 1st Ave. N., Birmingham, Ala. 35202
Austin, Robert E., 1947 Lanier Pl. N.W., Washington, D.C. 20009
Avery, Willis F., 64 Waldorf Dr., Akron, Ohio 44313

B

Bader, I. Walton, 274 Madison Ave., New York, N.Y. 10016
Bailey, Robert C., Suite 41, 1150 Connecticut Ave., Washington, D. C. 20007
Balas, Michael, 10208 Bieber Pl., Silver Spring, Md. 20901
Baldwin, Gerald S., 219 Aqua Ct., Royal Oak, Mich. 48075
Baldwin, Joseph L., Assn of American Railroads, Transportation Bldg., Suite 835, 17th and H Sts. N.W., Washington, D.C. 20006
Balhoff, John T., Ethyl Corp., 316 Commerce Bldg., 333 Laurel, Baton Rouge, La. 70821
Ball, John W., Jr., Erie Lackawanna Railway Co., Midland Bldg., Suite 1336, Cleveland, Ohio 44113
Bamford, Warren H., Davidsonville, Md. 21035
Barbosa, Joseph A., Brown Co., 277 Park Ave., New York, N.Y. 10011
Barkelew, James T., 385 S. Bonnie Ave., Pasadena, Calif. 91106
Barnes, Edward E., 1502 Norton Bldg., 2nd and Columbia, Seattle, Wash. 98104
Bartlett, Ernestine C., Allied Chemical Corp., 40 Rector St., New York, N.Y. 10017
Barton, Herbert J. O., Box 198, RD #1, Hopewell, N.J. 08525
Bass, Alvin S., E. I. du Pont de Nemours & Co., Inc., 1166 National Press Bldg., Washington, D.C. 20004
Bateman, Adrian L., Jr., 600 John Mariner Bldg., 411 E. Mason St., Milwaukee, Wis. 53202
Bauer, William H., 1280 21st St. N.W., Washington, D.C. 20036
Bayer, Harold C., 25 Main St., East, Suite 202, Rochester, N.Y. 14614
Beck, Stuart E., Land Title Bldg., Philadelphia, Pa. 19110
Beckley, W. Bruce, 116 S. 4th St., Las Vegas, Nev. 89100
Bedard, J. Rene, Canadian Industries Ltd., C-I-L House, 630 Dorchester Blvd. W., Montreal, Quebec, Canada
Beecher, Bryce, % Stauffer Chemical Co., P.O. Box 428, Adrian, Mich. 49221
Beecher, Keith D., 15233 Ventura Blvd., Suite 716, Sherman Oaks, Calif. 91403
Behn, Victor D., Curtiss-Wright Corp., 304 Valley Blvd., Wood-Ridge, N.J. 07075
Beland, Walter H., Continental Can Co., Inc., Plant #120, 7622 S. Racine Ave., Chicago, Ill. 60620
Bell, John M., 5911 Craig St., Springfield, Va. 22150
Belt, Robert E., 1216 Highlander Pl., Prescott, Ariz. 86301
Bender, William H., 40 W. Lancaster Ave., Downingtown, Pa. 19335
Bennett, Harold F., IIT Research Institute, Suite 4E–8–1, 10 W. 35th St., Chicago, Ill. 60616
Benson, Ikel C., 1434 Hythe St., St. Paul, Minn. 55108
Berdine, Vernon C., 39 S. LaSalle St., Chicago, Ill. 60603
Bergendorf, Harold W., Universal Oil Products Co., 30 Algonquin Rd., Des Plaines, Ill. 60016
Bernstein, Benjamin, Sperry Gyroscope Co., Patents Dept., Great Neck, N.Y. 11020
Bernstein, Samuel, 1328 Van Buren St. N.W., Washington, D.C. 20012
Bernstein, Saul H., Savoy Construction Co., Inc. 703 Summit Hill Office Bldg., 8555 16th St. N.W., Washington, D.C. 20012
Berrier, Erwin F., Jr., 8 S. Michigan Ave., Chicago, Ill. 60603
Besha, Richard G., 910 Wire Bldg., 1000 Vermont Ave. N.W., Washington, D.C. 20005
Bethers, Pratt G., Washington College, Chestertown, Md. 21620
Bethurum, William J., III, 6829D E. Osborn, Scottsdale, Ariz. 85251
Biggs, Sheridan C., General Electric Co., Bldg. 5, Rm. 107, Appliance Pk., Louisville, Ky. 40207
Birch, Harry D., 131 Anza Vista Ave., San Francisco, Calif. 94115
Birchall, David R., The Goodyear Tire & Rubber Co., 1144 E. Market St., Akron, Ohio 44316
Bishoff, Theodore, O.F C. Bldg., 1730 Rhode Island Ave. N.W., Washington, D.C. 20036
Bissinger, Frederick L., Stauffer Chemical Co., 380 Madison Ave., New York, N.Y. 10017
Bizzano, Joseph D., Jr., 411 E. Mason St., Milwaukee, Wis. 53202
Bjorndal, Magnus, Tech Lab., Inc., Bergen and E. Edsall Blvds., Palisades Park, N.J. 07050
Black, James L., Jr., Royal McBee Corp., 150 New Park Ave., Hartford, Conn. 06106
Bley, Roger F., 1271 S. Willette, Apt. 8, Memphis, Tenn. 38106
Bliss, George R., Towne House #126, 4900 Telegraph Rd., Ventura, Calif. 93003
Blodgett, Edwin O., Friden Inc., Rochester Div., 97 Humboldt St., Rochester, N.Y. 14602
Blum, Abram, 4710 Pinetree Dr., Miami Beach, Fla. 33141
Boesen, Peter M., 26 Broadway, New York, N.Y. 10004
Bohan, J. L., United Technology Ctr., Div. of United Aircraft Corp., P.O. Box 358, Sunnyvale, Calif. 94088
Boland, Thomas R., 2400 Virginia Ave. N.W., Apt. C–811, Washington, D.C. 20037
Bonett, David J., 1717 Avenue N, Apt. 2J, Brooklyn, N.Y. 11230
Bopf, Edward C., John Deere S.A., John Deere Rd., Moline, Ill. 61265
Borcherding, Walter H., 145 Northgate Ave., Dale City, Calif. 94014
Borden, Frank H., 4622 Wayne Ave., Philadelphia, Pa. 19144
Borlik, Edward Leo, 27 S. Park Dr., Arlington, Va. 22202
Borthwick, Harold H., Armstrong Cork Co., Liberty St., Lancaster, Pa. 17604
Borum, Charles J., Harris-Intertype Corp., Illuminating Bldg., 55 Public Square, Cleveland, Ohio 44113
Bothwell, Fordyce A., Philco Corp., Plant 2, Tioga & C Sts., Philadelphia, Pa. 19100
Botney, Allen Eli, 9300 Wilshire Blvd., Beverly Hills, Calif. 90212
Bourne, Hunter C., Jr., Washington & Lee Savings & Loan Bldg., 1817 Richmond Hwy., Alexandria, Va. 22300
Bower, James H., Ex-Cell-O, 1200 Oakman Blvd., Detroit, Mich. 48238
Boyden, J. Hanson, Sr., Suite 315, 1225 Connecticut Ave. N.W., Washington, D.C. 20036
Boyer, John A., The Niagara Wire Weaving Co., Ltd., 1400 Robinson St., Niagara Falls, Ontario, Canada
Boynton, Henry S., Eastman Kodak Co., Bldg. 54–D, Tennessee Eastman Co., Kingsport, Tenn. 37662
Braddock, John S., IV, 505 Cherry St. S.E., Apt. 607, Grand Rapids, Mich. 49503
Bradley, Walter E. F., Otis Elevator Co., 260 11th Ave., New York, N.Y. 10001
Brandeau, Edward P., 530 5th Ave., New York, N.Y. 10000
Breymann, Bernard H., 26 S. Mousey Rd., Monsey, N.Y. 10952
Brezina, John F., Borg-Warner Bldg., 200 S. Michigan Ave., Chicago, Ill. 60604
Bromley, Frederick C., 605 C.P.R. Bldg., 69 Yonge St., Toronto, Ontario, Canada
Brower, Edgar J., Office of Naval Research, Navy Dept., Rm. 4243, Washington, D.C. 20025
Brown, Herbert H., Wright-Patterson Air Force Base, Base B., Bldg. 11, Springfield Ave., Dayton, Ohio 45406
Brown, Jo. Baily, 1706 First National Bank Bldg., Wood St., Pittsburgh, Pa. 15222
Brown, Theodore L., Tibbetts Industries, Inc., Colorado Ave., Camden, Maine 04862
Brumbaugh, Heber B., 3722 Manor Rd., Chevy Chase, Md. 20015
Buckley, Malcolm K., 1608 Liberty Bank Bldg., Buffalo, N.Y. 14202
Buckley, Robert B., Highlands Apt. 208, 1914 Connecticut Ave. N.W., Washington, D.C. 20009
Budrow, Theodore T., 6249 E. Des Moines St., Mesa, Ariz. 85205
Burgess, Harry C., Gen. Elec. Co., Rm. 1425, Lakeside Ave., Burlington, Vt 05401
Burlingame, Robert E., 5052 Clark Dr., Shawnee Mission, Kans. 66205
Burroughs, Robert A., 149–24 80th St., 2nd Fl., Howard Beach, N.Y. 11414
Burrows, William D., 17, Quai Voltaire, Paris, France
Bush, Curtis, 906 Kahl Bldg., 326 W. 3rd, Davenport, Iowa 52801
Bush, Don P., Western Electric Co., Inc., P.O. Box 49404, Atlanta, Ga. 30329
Butcher, John W., Borg-Warner Corp., 200 S. Michigan Ave., Chicago, Ill. 60604

C

Campbell, Sybil A., 17 Roanoke Rd., Wellesley, Mass. 02181
Carlson, Chester F., 133 Crescent Hill Rd., Pittsford, N.Y. 14534
Carlson, George R., 1708 Merrimac Dr., Hyattsville, Md. 20783
Carlson, Reuben T., 63 Wall St., New York, N.Y. 10005
Carlson, Robert W., 821 National Press Bldg., Washington, D.C. 20004
Carlson, Walter A., General Mills, Inc., 9200 Wayzata Blvd., Minneapolis, Minn. 55440
Carmichael, Paul D., Jr., IBM, Old Orchard Rd., Armonk, N.Y. 10504
Carr, William P., Perrysburg Bank Bldg., 101 E 2nd St., Perrysburg, Ohio 43551
Caswell, Fred C., 1150 Northwestern Bank Bldg., Minneapolis, Minn. 55402
Cavanagh, John R., 8th Fl., 11 Adelaide St. W., Toronto, Ontario, Canada
Cayne, Maurice S., 39 S. LaSalle Bldg., Chicago, Ill. 60603
Chognard, Andre R., 29 Rue Cambon, Paris 1er, France

C—Continued

Christensen, Camille M., 256 Chantry Rd., Timonium, Md. 21093
Church, Charles E., Box 549, Burlington, Ontario, Canada
Church, J. Frank, 1700 Church Court, Bartlesville, Okla. 74004
Churchill, Robert R., 926 Tremont Bldg., 73 Tremont St., Boston, Mass. 02108
Clark, Barry L., Baxter Laboratories, Inc., 6301 Lincoln Ave., Morton Grove, Ill. 60053
Clark, Robert B., Warner-Lambert Pharmaceutical Co., 201 Tabor Rd., Morris Plains, N.J. 07950
Clesner, Herschel F., U.S. Public Health Service, HEW North, 4th and Independence S.W., Washington, D.C. 20203
Cline, Arthur R., Jr., Hupp Corp., 1135 Ivanhoe Rd., Cleveland, Ohio 44110
Cobb, Joe G., David Sarnoff Research Labs., RCA, Route 1, Princeton, N.J. 08540
Cody, Robert F., Eastman Kodak, Kodak Park, Rochester, N.Y 14650
Cohen, Ben, 326 Woodward Bldg., 733 15th St. N.W., Washington, D.C. 20005
Colaianni, Joseph V., 1000 Vermont Ave. N.W. Washington, D.C. 20005
Cole, Harold E., 6 Brook St., Taunton, Mass. 02780
Cole, Samuel F., 506 Seward Sq. S.E. Washington, D.C. 20003
Cole, William P., The Polymer Corp., 2120 Fairmont Ave., Reading, Pa. 19603
Collons, Rodger D., Route 2, Austell, Ga. 30001
Combs, L. A., Container Corp. of America, 38 S. Dearborn St., Chicago, Ill. 60603
Conger, Lyman C., Kohler Co., High St., Kohler, Wis. 53044
Conner, Donald L., The Dow Chemical Co., Midland, Mich. 48640
Connors, John J., Standard Oil Co. (Indiana), 910 S. Michigan Ave., Chicago, Ill. 60680
Cooch, Thomas, 545 Technology Sq., Cambridge, Mass. 02139
Cook, James J., 6623 32nd St. N.W., Washington, D.C. 20015
Cook, Junius F., Jr., 135 S. LaSalle St., Chicago, Ill. 60603
Cooke, Horace B., Sr., 711 14th St. N.W., Suite 1228, Washington, D.C. 20005
Cooper, D. Kendall, IBM Corp., New Circle Rd., Lexington, Ky. 40507
Corbin, Douglas T., 1905 Mills Tower, 220 Bush St., San Francisco, Calif. 94104
Coughlin, Henry W., General Aniline & Film Corp., 140 W. 51st St., New York, N.Y. 10020
Cowan, Edward J., Sr., 4640 Province Line Rd., Princeton, N.J. 08540
Crawford, G. M., 300 Bevington Rd., Pittsburgh, Pa. 15221
Critchlow, Paul N., Office of Naval Research, U.S. Navy Elec. Lab., Bldg. 2, San Diego, Calif. 92152
Crossley, Arthur W., 1373 Skiles Lane, St. Paul, Minn. 55112
Crouch, Robert B., Information Storage Systems, Inc., 1376 N. 4th St., San Jose, Calif. 95112
Crouse, Carl W., 900 Club House Dr., Aptos, Calif. 95003
Cuiffo, Frank W., 330 Madison Ave., New York, N.Y. 10017
Culbertson, William S., 1155 15th St. N.W., Washington, D.C. 20005
Cummings, Henry W., 10211 Heather Hills Rd., Indianapolis, Ind. 46206
Curley, James A., U.S. Dept. of Justice, Civil Div., Patent Sec., Washington, D.C. 20530.
Curry, Charles D. B., Gen. Elec. Co., APED Bldg. N., 175 Curtner, San Jose, Calif. 95125
Curtis, Edward G., 28 Greenfield Ave., Bronxville, N.Y. 10708
Cutonilli, Anthony, 2416 K St. N.W., Apt. 706, Washington, D.C. 20037

D

Dacey, G. Eugene, 80 Porter Rd., Cambridge, Mass. 02140
Dameron, Roland M., Jr., Heathsville, Va. 22473
Damian, John U., 19400 Outer Dr. Ct., Dearborn, Mich. 48127
Davico, Virgil F., 187 Van Buren Ave., Teaneck, N.J. 07666
Davies, Henry R., 1473 Miramonte Ave., Apt. 5, Los Altos, Calif. 94022
Davies, William H., 7621 Westmoreland Ave., Clayton, Mo. 63105
Davis, Edward H., 12 S. 12th St., Suite 1425, Philadelphia, Pa. 19107
Davis, Gerard B., 553 3rd St., Brooklyn, N.Y. 11215
Davis, James F., 1400 Field Bldg., 135 S. LaSalle St., Chicago, Ill. 60603
Davis, Philip C., 710 Frank Nelson Bldg., Birmingham, Ala. 35203
Day, William R., Wyandotte Chemicals Corp., 1609 Biddle Ave., Wyandotte, Mich. 48192
Dearborn, Richard J., 330 Madison Ave., New York, N.Y. 10017
DeArment, Phillip L., 1111 Leader Bldg., Cleveland, Ohio 44114
Deef, Francis H., W. R. Grace & Co., Washington Research Center, Clarksville, Md. 21029
DeFrance, Albert K., Jr., 522 Sherwood Rd., Shreveport, La. 71101
Deletzke, Norman E. H., Sr., 224 Sheridan Rd., Kenilworth, Ill. 60043
Delyea, Stephen W., American Cyanamid Co., 1937 W. Main St., Stamford, Conn. 06904
Detrich, Donald J., 3134 Torrington St., Hilliard, Ohio 43026
Dew, Arthur W., Bldg. 1, Crystal Plaza, Suite 602, 2001 Jefferson Davis Hwy., Arlington, Va. 22202
Dickerson, Francis A., 1563 E. Turner St., Clearwater, Fla. 33516
Dillon, Lyle, 440 N. Gerona Ave., San Gabriel, Calif. 91775
Dionne, Arthur F., Third National Bank Bldg., Springfield, Mass. 01103
Dodd, Marcus W., Plaza Bldg., Pittsburgh, Pa. 15219
Doris, Abraham L., 268 Ashland Pl., Apt. 405, Brooklyn, N.Y. 11217
Dotts, Walter M., Jr., 2605 Monument Ave., Richmond, Va. 23220
Dougherty, Patrick H., 5812 Alton Rd., Miami Beach, Fla. 33140
Douglas, Joseph H., 41–67 Judge St., Apt. 5–O, Elmhurst, N.Y. 11373
Downes, Harold J., Lear Siegler, Inc., Burgstrasse 12, Wiesbaden, Germany
Downing, William W., Jr., 356 National Press Bldg., Washington, D.C. 20004
Drews, Gustav, 365 Stewart Ave., Apt. B18, Garden City, N.Y. 11530
Dubiel, Joseph M., 110 W. 7th St., San Pedro, Calif. 90731
Dunlap, Robert H., 60 W. Broad St., Mount Vernon, N.Y. 10552
Dustin, H. Mial, General Electric Co., 13430 N. Black Canyon Hwy., P.O. Drawer 270, Phoenix, Ariz. 85023
Dybvig, Edwin S., 2442 Elsmere Ave., Dayton, Ohio 45406
Dybvig, Henry G., 312 Oakview Dr., Kettering, Ohio 45429
Dziurgot, Robert F., 1460 Sandburg Terr., Apt. 1501, Chicago, Ill. 60610

E

Earnest, James M., Woodward Bldg., Washington, D.C. 20005
Eaton, Donald G., 880 National Press Bldg., Washington, D.C. 20004
Eccleston, W. J., 3425 16th St. N.W. #109, Washington, D.C. 20010
Edwards, Elgin C., 24311 Bark St., El Toro, Calif. 92630
Elifort, David H., 8145 Blackburn Ave., Los Angeles, Calif. 90048
Eisner, Neil A., Burnham & Co., 60 Broad St., New York, N.Y. 10004
Elderkin, Charles B., Johnston Bldg., S. Tryon St., Charlotte, N.C. 28202
Ells, C. Carter, Jr., 2426–B Mulberry Lane, Indianapolis, Ind. 46227
Emery, Gustav H., 909 Bowen Bldg., 815 15th St. N.W., Washington, D.C. 20005
Emery, Natt M., Bethlehem Steel Corp., Homer Res. Labs., Bldg. A–235, Bethlehem, Pa. 18016
Engel, Abraham, 340 W. 72nd St., New York, N.Y. 10023
Epperson, William P., Texaco Inc., 1715 Chrysler Bldg., 135 E. 42nd St., New York, N.Y. 10017
Epstein, Frank J., U.S. Naval Ordnance Test Sta., 3202 E. Foothill Blvd., Pasadena, Calif. 91107
Epstein, Saul, 5015 Varna Ave., Sherman Oaks, Calif. 91403
Epstein, William H., 25 Clifton Ave., Newark, N.J. 07101
Ericson, Richard, U.S. Gypsum Co., Research Center, 1000 E. Northwest Hwy., Des Plaines, Ill. 60016
Esher, Frederick N., Pennsylvania State University, Hazleton Campus, Hazleton, Pa. 18201
Eubanks, James T., The Garrett Corp., 9851 Sepulveda Blvd., Los Angeles, Calif. 90009
Evans, Clarence B., 517 N. Stone Ave., LaGrange Park, Ill. 60528
Evrard, David E., Dept. of the Navy, Office of Naval Research, 20th and Constitution Ave. N.W., Washington, D.C. 20360

F

Fagal, Frederick F., The Southern New England Telephone Co., 227 Church St., New Haven, Conn. 06506
Faggan, Joseph E., Ethyl Corp., 1400 W. Eight Mile Rd., Ferndale, Mich. 48220
Falley, Neil J., 13540 Saraview Dr., Saratoga, Calif. 95070
Fayerweather, Bruce L., Sr., Box 1967, Midland, Mich. 48640
Fellner, I. J., 6445 Luzon Ave. N.W., #212, Washington, D.C. 20012
Felsher, Gary H., 13241 S.W. 69th Court, Miami, Fla. 33156
Ferebee, George P., Radio Corp. of America, David Sarnoff Res. Center, Princeton, N.J. 08540
Ferguson, John A., 8413 Anderson St., Philadelphia, Pa. 19118
Ferraro, John F., 2 Overhill Rd., Thompsonville, Conn. 06082
Field, Albert E., National Castings Co., 10600 Quincy Ave., Cleveland, Ohio 44106
Fielden, Arthur, Lupton & Place Ltd., Trafalgar St., Burnley, England
Finch, Peyton N., Jr., U.S. Pipe and Foundry Co., 3300 1st Ave. N., Birmingham, Ala. 35202
Finken, Warren E., General Motors Corp., 300 Taylor St., Dayton, Ohio 45401
Finnegan, Martin J., Hq. USAF (AFJALP), Forrestal Bldg., Washington, D.C. 20330
Fish, Paul W., Xerox Corp., Four Corners Bldg., Main St., Rochester, N.Y. 14601
Fisher, George H., Honeywell Inc., 2747 4th Ave. S., Minneapolis, Minn. 55408
Fisher, Thomas E., 1805 The East Ohio Bldg., Cleveland, Ohio 44114
Fitzsimmons, James W., American Can Co., 100 Park Ave., New York, N.Y. 10017
Flammer, Howard A., 481 S.W. 8th Terr., Boca Raton, Fla. 33432
Fleming, William W., Dept. of Justice, HOLC Bldg., 101 Indiana Ave., Washington, D.C. 20530
Fletcher, Louis D., 12 Rutland Rd., Scarsdal, N.Y. 10584
Flick, Fulton B., 800 Benedum-Trees Bldg., Pittsburgh, Pa. 15222
Flint, J. Howard, Round Hill, Va. 22141
Florance, Warren M., 1217 Lorain Ave., Bethlehem, Pa. 18018
Flynn, Edward M., Dept. of Justice, Civil Div., Federal Triangle Bldg., 315 9th St. N.W., Washington, D.C. 20035
Fogiel, Max, 420 Madison Ave., New York, N.Y. 10017
Foltz, Ramon D., 1414 Winston Rd., South Euclid, Ohio 44121

F—Continued

Forman, Charles D., 1254 Clinton Pl., #1E, Elizabeth, N.J. 07208
Forman, Kenneth E., Dymo Industries, 6701 Bay St., Berkeley, Calif. 94706
Fox, Harold G., Suite 502, 425 University Ave., Toronto 100, Ontario, Canada
Fralick, James E., 4087 Indianola Ave., Columbus, Ohio 43214
Francis, Gene W., Jr., 800 Adolphus Tower, 1400 Main, Dallas, Tex. 75202
Frankl, Robert, 149 Vista DeLaCumbre, Santa Barbara, Calif. 93105
Freeman, Alfred B., 2602 Grand Ave., North Bergen, N.J. 07447
French, Ralph T., Westinghouse Elec. Corp., Churchill, Pittsburgh, Pa. 15235
Frey, Cullen G., 19 Powell Lane, West Chester, Pa. 19380
Friedberg, Gary A., Frankford Arsenal, Bldg. 519, Tacony and Bridge Sts., Philadelphia, Pa. 19137
Friedenson, Jay Philip, 156 Meadowview Lane, Williamsville, N.Y. 14221
Friedman, Robert S., General Electric Co., Waterford, N.Y. 12188
Fritschler, Alvin H., Cities Service Co., 60 Wall St., New York, N.Y. 10005
Fuld, Leonhard Felix, 93 Fuld St., Trenton, N.J. 08638
Funk, Howard B., Aluminum Co. of America, Box 772, New Kensington, Pa. 15068

G

Gable, Raymond L., Westinghouse Elec. Corp., R & D Ctr., Beulah Rd., Pittsburgh, Pa. 15235
Gagnon, Louis L., 31 Newell Ave., Southbridge, Mass. 01550
Galleher, Harry E., Jr., 209 N. Wayne St., #1, Arlington, Va. 22201
Gamble, Ralph H., 67 Oakbourne Rd., West Chester, Pa. 19380
Gannon, Martin A., 314 King St., Alexandria, Va. 22300
Ganoe, Joseph, Aluminum Co. of America, New Kensington, Pa. 15068
Gardes, George W., Solar Div., International Harvester Co., 2200 Pacific Ave., San Diego, Calif. 92112
Gehr, Ray S., 2404 Fulton St., #302, Berkeley, Calif. 94704
Geist, Robert L., 2705 E. Glenrosa Ave., Phoenix, Ariz. 85016
George, Joseph J., Vickers Inc., Maple and Crooks Rd., Troy, Mich. 48084
Gerber, Eliot S., 30 Broad St., New York, N.Y. 10004
Gervais, Wilfrid A., General Electric Co., 159 Madison Ave., New York, N.Y. 10016
Giancola, Dominic J., Richardson-Merrill Inc., 122 E. 42nd St., New York, N.Y. 10017
Giles, E. Manning, 3200 American National Bank Bldg., 33 N. LaSalle St., Chicago, Ill. 60602
Gillespie, Harrey M., 1442 W. Irving Park Rd., Chicago, Ill. 60613
Girard, Arthur L., 8248 Farnum, Warren, Mich. 48093
Girman, Eugene P., 808 Law and Finance Bldg., 429 4th Ave., Pittsburgh, Pa. 15219
Godfrey, Howard L., 8516 Shepherd St., Chevy Chase, Md. 20015
Goetsch, Richard J., Standard Oil Co. (Indiana), 910 S. Michigan Ave., Chicago, Ill. 60680
Goetz, Donald H., 469 Donna Dr., Bridgman, Mich. 49106
Golden, Abraham H., 129 Old North Stamford Rd., Stamford, Conn. 06901
Goldsby, Arthur R., Texaco Inc., 135 E. 42nd St., New York, N.Y. 10017
Goller, Gilbert M., 10 Rachov Harav Frank, #1, Bayit Vegan, Jersusalem, Israel
Goodson, Wallace G., Itek Corp., 10 Maguire Rd., Lexington, Mass. 02173
Gordon, George H., 3229 N. Hamlin Ave., Chicago, Ill. 60618
Goshay, Irl R., 149 S. Almont Dr., Beverly Hills, Calif. 90211
Gould, Murray W., Box 237, Lottsburg, Va. 22511
Gould, Norman S., 205–09 Jamaica Ave., Jamaica, N.Y. 11423
Graf, Fdererick J., 6010 Arlington Ct., Indianapolis, Ind. 46226
Graham, John H., Esso Res. and Eng. Co., 614 Hersh Tower, 125 Broad St., Elizabeth, N.J. 07207
Graham, Robert L., International Harvester Co., 401 N. Michigan, Chicago, Ill. 60611
Graham, William B., Baxter Laboratories, Inc., 6301 Lincoln Ave., Morton Grove, Ill. 60053
Grayson, Stephen R., Service Bureau Corp., 301 Wheaton Plaza Office Bldg., Wheaton, Md. 20900
Greenberg, Carl J., 188 W. Randolph St., Chicago, Ill. 60601
Greene, Albert J., Monsanto Co., 800 N. Lindberg, St. Louis, Mo. 63166
Greenside, Ernest A., 421 7th Ave., New York, N.Y. 10001
Griffin, Albion M., Bethlehem Steel Corp., Homer Res. Labs., Bethlehem, Pa. 18016
Griffin, J. Donald, Jr., 720 Transportation Bldg., 815 17th St. N.W., Washington, D.C. 20006
Grimshaw, Robert S., West Virginia Pulp & Paper Co., 230 Park Ave., New York, N.Y. 10017
Gritzbaugh, Edward C., 1023 Alfred I. DuPont Bldg., 169 E. Flagler St., Miami, Fla. 33131
Grover, Charles S., 75 Federal St., Boston, Mass. 02110
Gruss, George A., Sr., 15 Grove St., Trumbull, Conn. 06611
Gulbrandsen, Christian A., Automatic Elec. Co., 400 N. Wolf Rd., Northlake, Ill. 60164
Guthrie, James M., Loftus Eng. Corp., One Gateway Center, Pittsburgh, Pa. 15222
Guthrie, Marvin C., State Street Bank Bldg., 225 Franklin St., Boston, Mass. 02110
Guthrie, Ross R., Central Intelligence Agency, Hdqrs. Bldg., Langley, Va. 23360

H

Habecker, Leon B., 10513 Greenacres Dr., Silver Springs, Md. 20903
Haefele, Donald J., Monsanto Co., 800 N. Lindbergh Blvd., St. Louis, Mo. 63166
Haigh, Henry W., Weyerhaeuser Co., 3400 13th Ave. S.W., Seattle, Wash. 98134
Halbert, George H., Rheem Mfg. Co., 400 Park Ave., New York, N.Y. 10022
Hall, Harrison J., Aircraft Div. Douglas Aircraft Co., Inc., 3855 Lakewood Blvd., Long Beach, Calif. 90801
Hall, John Alden, 72 Blackburn Rd., Summit, N.J. 07901
Hall, Sheldon F., 42 Harbor Hill, Grosse Pointe Farms, Mich. 48236
Hallacher, Lester L., Bendix Corp., Executive Offices, Bendix Center, Southfield, Mich. 48075
Halstead, Friend O., R.R. 3, Bristol, Ind. 46507
Halvorsen, Ronald M., Johns-Manville Corp., Research & Engineering Center, Manville, N.J. 08835
Hambly, Allen E., Byron Jackson Div., Borg-Warner Corp., 2301 E. Vernon Ave., Vernon, Calif. 90054
Hamlin, Marston, 251 Rocklyn Ave., Lynbrook, N.Y. 11563
Hammond, Thomas M., American Machine & Foundry Co., 261 Madison Ave., New York, N.Y. 10016
Harkins, Joseph C., Jr., Congoleum-Nairn Inc., 195 Belgrove Dr., Kearny, N.J. 07032
Harmon, William A., U.S. Air Force, Pentagon, Rm. 4C258, Washington, D.C. 20025
Harris, Daniel E., 64 Pearl St., Hartford, Conn. 06100
Harris, Floyd M., RCA, Princeton, N.J. 08540
Harris, Ray M., NASA, Universal North Bldg., 1875 Connecticut Ave. N.W., Washington, D.C. 20546
Harrison, Donald C., Union Carbide Corp., 270 Park Ave., New York, N.Y. 10017
Harrison, John M., 8218 Spring Valley Rd., Apt. 214, Dallas, Tex. 75240
Hart, Wayne M., 371 Fairmount Ave., Chapham Township, N.J. 07920
Harvey, John A., 330 Madison Ave., New York, N.Y. 10017
Harwood, Thomas A., 1600 Metropolitan Federal Savings Bldg., Dallas, Tex. 75202
Hastings, George S., 102 Brookside Rd., Darien, Conn. 06820
Hauke, Thomas A., 1009 N. Jackson St., Apt. 1602, Milwaukee, Wis. 53202
Hawley, Luther W., 233 Broadway, New York, N.Y. 10007
Hayes, Richmond S., 512 Fenton Bldg., Jamestown, N.Y. 14701
Haynes, Clyde H., St. Regis Paper Co., 150 E. 42nd St., New York, N.Y. 10017
Haynie, Philip M., 10917 Cherry Ave., Fontana, Calif. 92335
Hazelwood, John N., Gen. Dynamics Corp., 1675 W. 5th Ave., Pomona, Calif. 91769
Heller, David M., 4936 W. Fargo Ave., Skokie, Ill. 60076
Henderson, Donald A., Polymer Corp. Ltd., South Vidal St., Sarnia, Ontario, Canada
Henderson, Lannas S., Jr., 5072 Torida Way, Yorba Linda, Calif. 92686
Henderson, Robert H., Western Union Co., Western Union Bldg., 60 Hudson St., New York, N.Y. 10013
Hensel, Jack, 5632 Mission Rd., Shawnee Mission, Kans. 66205
Herring, Joseph C., 3325 N. Main St., Findlay, Ohio 45850
Hespen, James F., 1220 Boatmen's Bank Bldg., 314 N. Broadway, St. Louis, Mo. 63102
Heyman, Thomas V., 100 Park Ave., New York, N.Y. 10017
Hiatt, Tom, 148 Arborwood Crescent, Rochester, N.Y. 14615
Hibbits, Roger M., 7808 Winward Dr., Normandy, Mo. 63121
Higgins, Edward S., 1234 Broadway, New York, N.Y. 10021
Higgs, Joseph B., Container Corp. of America, 38 S. Dearborn St., Chicago, Ill. 60603
Hildreth, Richard R., Boston Five Cents Savings Bank Bldg., 24 School St., Boston, Mass. 02108
Hill, Frank B., 287 North Ave., Battle Creek, Mich. 49017
Hill, Roy W., 1112 Monadnock Block, 53 W. Jackson Blvd., Chicago, Ill. 60604
Hill, Walter M., Bell Telephone Labs., Inc., Whippany, N.J. 07981
Hobson, John R., Emhart Corp., Hartford, Conn. 06102
Hodges, H. Hamlin, 5 E. Kirks St., Chevy Chase, Md. 20015
Hodsdon, Walter O., Eastman Kodak Co., 343 State St., Rochester, N.Y. 14650
Hoegh, Richard B., 615 S. Flower St., Suite 604, Los Angeles, Calif. 90017
Hoffman, D. J., 76 W. 85th St., Apt. 1E, New York, N.Y. 10024
Hofgren, Axel A., 20 N. Wacker Dr., Chicago, Ill. 60606
Hoge, John R., 1920 Collingwood Blvd., Apt. 1006, Toledo, Ohio 43624
Holaday, Harold O., 2265 Del Mar Rd., Montrose, Calif. 11020
Holbrook, C. Ray, Jr., 1217 1st St., Box 696, La Marque, Tex. 77568
Holcomb, William J., Betz Labs., Inc., Gillingham and Worth Sts., Philadelphia, Pa. 19124
Holcombe, John H., IBM Corp., Monterey and Cottle Rds., San Jose, Calif. 95114
Holcombe, Marshall M., AMP Incorporated, 3711 Paxton St., Harrisburg, Pa. 17105
Holden, Thomas J., 4205 N. Charles St., Baltimore, Md. 21218
Holder, John E., Sr., 8514 Dashwood, Houston, Tex. 77036
Holland, Clay, Jr., Gourdine Systems, Inc., 119 Naylor Ave., Livingston, N.J. 07039
Holton, Jesse A., 7 Ridgewood Rd., West Hartford, Conn. 06100
Hoods, Stanley, 53 W. Jackson Blvd., Chicago, Ill. 60604
Hoover, E. E. 4622 N. 14th St., Arlington, Va. 22200
Horne, Robert E., 777 N. 1st St., Suite 215, San Jose, Calif. 95112

H—Continued

Horten, Carl R., Ingersoll-Rand Co., 11 Broadway, New York, N.Y. 10014
Hough, George A., Jr., 2453 Elizabeth Ann Lane N.E., Atlanta, Ga. 30324
Houseal, William, Whirlpool Corp., 300 Broad St., St. Joseph, Mich. 49085
Howard, Donald J., Mobil Oil Corp., 1460 Broadway, New York, N.Y. 10036
Howell, William T., 74 Dale Ave., Toronto, Ontario, Canada
Howson, Charles E., Sr., 651 N. Terrace Ave., Mt. Vernon, N.Y. 10552
Howson, Hubert F., 100 Constitution Plaza, Hartford, Conn. 06103
Howson, James D., 507 Woodland Ct., Wayne, Pa. 19087
Hoxie, John, 30 Broad St., New York, N.Y. 10004
Hoy, W. Duffield, Bethlehem Steel Co., Research Dept., Bethlehem, Pa. 18015
Hubbard, Frank H., 2653 N. 81 St., Wauwatose, Wis. 53213
Hudson, Kenneth D., 31 Milk St., Boston, Mass. 02109
Hui, Shui Tong, Sperry-Hutchinson Bldg., 330 Madison Ave., New York, N.Y. 10017
Hull, Charles W., 208 Walnut St., Box 26, Harrisburg, Pa. 17108
Hulse, H. H., General Time Corp., 355 Lexington Ave., New York, N.Y. 10017
Hultquist, J. Albert, Fiske Hill Rd., Sturbridge, Mass. 01566
Hunter, Thomas B., 1016 Gables Blvd., Wheaton, Ill. 60187
Hunter, William L., Sanders Associates, Inc., 95 Canal St., Nashua, N.H. 03060
Husser, John D., 20 Knollbrook Rd., Apt. 1, Rochester, N.Y. 14610
Hutchinson, Milo H., 9 Washington Park, Maplewood, N.J. 07040
Hutton, Harry T., Continental Oil Co., P.O. Drawer 1267, Ponca City, Okla. 74602
Hyde, George G., 3710 Gulf of Mexico Dr., Sarasota, Fla. 33577

I

Ibbison, Edward C., Atlas Chemical Industries, Inc., Concord Pike and New Murphy Rd., Wilmington, Del. 19899
Ingalls, Hayden W., Solar Div. of International Harvester Co., 2200 Pacific Hwy., San Diego, Calif. 92112
Ingraham, R. B., Box 1967, Midland, Mich. 48640
Isaacs, Joseph, 4501 Connecticut Ave., Apt. 714, Washington, D.C. 20008
Ischinger, Alfred E., 803 Medical Arts Bldg., 230 N. 5th St., Reading, Pa. 19601

J

Jabas, Florian H., 6024 Sumner Rd., Alexandria, Va. 22310
Jamieson, Hamer H., 2008 Cambridge Pl., South Pasadena, Calif. 91030
Januszkiewicz, Joseph, The B. F. Goodrich Co., 500 S. Main St., Akron Ohio 44318
Jaspert, William B., First National Bank Bldg., Pittsburgh, Pa. 15222
Jeffers, Jerome L., Dow Chemical Co., Bldg., 566, Midland, Mich. 48640
Jenks, Clayton L., 25 Rocky Pond Rd., Boylston, Mass. 01505
Jennings, Richard M., Lab. for Electronics, Inc., 1601 Trapelo Rd., Waltham, Mass. 02154
Johanningsmeier, Walter F., Herner & Co., 2431 K St. N.W., Washington, D.C. 20005
Johnson, Bob Gray, American Enka Corp., Enka, N.C. 20728
Johnson, Carl L., East 1505 First National Bank Bldg., St. Paul, Minn 55101
Johnson, Clair V., U.S. Vitamin & Pharmaceutical Corp., 800 2nd Ave., New York, N.Y. 10017
Johnson, Edgar J., 277 Moore St., Princeton, N.J. 08540
Johnson, Merrill N., 5670 Carvel Ave., Indianapolis, Ind. 46220
Johnson, Vernon A., Torso Mfg. Corp., 8111 Lyndale Ave. S., Bloomington, Minn. 55420
Johnson, Wilbur A., 1 Green Valley Dr., Green Brook, N.J. 08813
Jones, George D., 6200 Gloria Dr., Suite 105, Sacramento, Calif. 95822
Jones, Morris, J., Bethlehem Steel Corp., Homer Res. Labs., Bethlehem, Pa. 19015
Jones, Raymond, 1312 Penna. Bldg., Washington, D.C. 20004
Jones, Walter G., 1230 6th Ave., New York, N.Y. 10020
Jones, Walter I., Off Spectacle Pond Rd., Littleton, Mass. 01460
Julien, Carl A., Deere & Co., 3300 River Dr., Moline, Ill. 61265
Junkins, Raymond D., 8257 Westmoreland Dr., Sarasota, Fla 33580
Just, William H., 1613 35th St. N.W., Washington, D.C. 20007

K

Kadel, Robert J., 330 Madison Ave., New York, N.Y. 10017
Kamm, Lawrence J., Numerical Control Corp., 3033 Jefferson St., San Diego, Calif. 92110
Kaprelian, Edward K., Res./Dev., 811 Philadelphia Rd., Joppa, Md. 21085
Karlsen, Ernest F., 3201 Landover St., Alexandria, Va. 22305
Kassman, Herbert S., Polaroid Corp., 730 Main St. Cambridge, Mass. 02139
Kavel, William C., 2087 Sherman Ave., Norwood, Ohio 45212
Keegan, Richard J., NASA, 726 Universal North, 1925 Florida Ave. N.W., Washington, D.C. 20546
Kehm, Walter C., 6301 Lincoln Ave., Morton Grove, Ill. 60053
Keighley, Lloyd M., 109 Lucero Dr., Port St. Lucie, Fla. 33450
Kelly, Joseph L., Office of Naval Research, Navy Dept. 18th and Constitution Ave. N.W., Washington, D.C. 20360
Kennedy, George H., Jr., 87 William St., Worcester, Mass. 01609
Kennedy, James J., 39 Marlborough Rd., West Hempstead, N.Y. 11552
Kersten, Alice Q., 4564 N. Ocean Dr., Lauderdale by the Sea, Fla. 33308
Keys, Clarence E., P.O. Box 1378, Monahans, Tex. 79756
Kieninger, Joseph E., Autonetics, 3370 Miraloma Ave., Anaheim, Calif. 92803
Kight, Alonzo B., North American Rockwell Corp., 5th and Wood, Pittsburgh, Pa. 15222
Kilgannon, William F., 30 Broad St., New York, N.Y. 10004
Kimmelman, Edward R., E. I. du Pont de Nemours & Co., Inc., Bldg. 510, Parlin, N.J. 08859
Kimpel, Raymond R., 708 E. Pennsylvania Ave., Urbana, Ill. 61801
King, Arthur M., Johnson & Johnson, 501 George St., New Brunswick, N.J. 08900
King, William K., Ford Motor Co., McKean and Textile Rd., Box 412, Ypsilanti, Mich. 48197
Kinney, Harold J., 2501 Hudson St., St. Paul, Minn. 55101
Kirby, Richard J., 406 4th Ave., Indialantic, Fla. 32903
Kirk, John R., Jr., 7603 Croton, Houston, Tex. 77036
Kirk, Richard B., Manufacturer's Aircraft Assn. Inc., 1032 Munsey Bldg., Washington, D.C. 20004
Kitt, Fred T., 263 21st St., Santa Monica, Calif. 90402
Klabunde, William, Houdry Process & Chem. Co., 1339 Chestnut St., Philadelphia, Pa. 19107
Klein, Paul M., Sr., 441 Oak Ave., Cedarhurst, L.I., N.Y. 11516
Klein, Sidney G., 2222 Fox Plaza, San Francisco, Calif. 94102
Kline, J. LeRoy, Textile Machine Works, Reading, Pa. 19605
Knapp, Ernest M., Sr., 1401 N. Herndon St., Arlington, Va. 22201
Knight, Alfred W., 1200 Lee Tower, Los Angeles, Calif. 90036
Knight, Geoffrey, 1055 Munsey Bldg., Washington, D.C. 20004
Koch, Albert A. H., Gen. Dynamics Corp., 10955 John Jay Hopkins Dr., La Jolla, Calif. 92112
Koch, John A., U.S. Atomic Energy Comm., P.O. Box 808, Livermore, Calif. 94551
Koprowski, Donald J., 214 W. Russell St. Barrington, Ill. 60020
Kothrade, Richard I., 7620 W. Center St., Milwaukee, Wis. 53222
Kotlar, Harry, 204 Bedford-Wilshire Bldg., 360 N. Bedford Dr., Beverly Hills, Calif. 90210
Kranzow, Ronald R., Kaiser Alum. & Chem. Corp., 300 Lakeside Dr., Oakland, Calif. 94612
Krazinski, Leo C., 71 Lafayette Ave., Suffern, N.Y. 10901
Kressler, D. E., Burroughs Corp., 6071 2nd Ave., Detroit, Mich. 48232
Kump, Ferdinand, Jr., Rte. 25A, Centerport, N.Y. 11721
Kurtossy, George C., 730 N. Atherton St., State College, Pa. 16801

L

Lacher, Richard W., 328 N. Plum Grove Rd., Palatin, Ill. 60067
Lamont, Dallas R., 300 Munsey Bldg., Washington, D.C. 20004
Lang, William, 15 Harkimer Rd., Scarsdale, N.Y. 10585
Laughlin, Earl C., 206 2nd Ave., Spring Lake, N.J. 01762
Laughlin, Myron P., 470 3rd St. S., St. Petersburg, Fla. 33701
Laundry, Melbourn E., 522 Byrd Rd., Riverside, Ill. 60546
Lautier, Vincent, IBM, Armonk, N.Y. 10504
Learman, Frank C., 200 Mutual Savings Bldg., Bay City, Mich. 48706
Ledbetter, James C., 12 E. 88th St., New York, N.Y. 10028
Lefco, Ted, Dept. of Agriculture, 1815 N. University St. Peoria, Ill. 61604
Lehrer, Solomon J., Wash. Loan & Trust Bldg., Washington, D.C. 20014
Leonard, Frederic B., 301 Riley St., Falls Church, Va. 22046
Lerner, Stanley S., 2700 Mitchell Dr., Walnut Creek, Calif. 94597
Le Seure, Ralph F., 26 Covertside Dr., Daynton, Ohio 45459
Lethert, Charles A., 650 Endicott Bldg., St. Paul, Minn. 55101
Letterle, Louis J., 4012 Watters Lane, Gibsonia, Pa. 15044
Levenson, Leonard H., 1305 Grant Bldg., Pittsburgh, Pa. 15219
LeVesconte, Harold J., 1880 Century Park E., Los Angeles, Calif. 90067
Levy, Edward F., 30 E. 42nd St., New York, N.Y. 10017
Levy, Richard A., 130 N. Ridge St., Port Chester, N.Y. 10573
Lewen, Bert J., 36 W. 84th St., New York, N.Y. 10024
Lewis, Walter, Sunbeam Corp., 5400 W. Roosevelt Rd., Chicago, Ill. 60650
Lichiello, James J., GE Co., 1 River Rd., Schenectady, N.Y. 12305
Liddy, Sylvester J., 165 Broadway, New York, N.Y. 10006
Lieber, William A., 780 N. Water St., Milwaukee, Wis. 53202
Liebrecht, Edward F., The M. W. Kellogg Co., 711 3rd Ave., New York, N.Y. 10017
Lilly, George E., Tenneco Chemicals, Inc., 290 River Dr., Garfield, N.J. 07026
Lindberg, Lawrence W., 5037 Cathedral Ave. N.W., Washington, D.C. 20016
Lipari, John J., Allied Chem. Corp., Box 405, Morristown, N.J. 07960
Lippman, Peter L, Applied Physics Corp., 2724 S. Peck Rd., Monrovia, Calif. 91017
Litton, James B., P.O. Box 55, Linden, N.J. 07036
Lobato, Emmanuel J., 253 Broadway, New York, N.Y. 10007
Lochner, Richard A., 90 Broad St., New York, N.Y. 10004
Longley, F. Alan, IBM, Components Div., Hopewell Junction, N.Y. 12533

L—Continued

Lord, George C., Whippany Rd., Morristown, N.J. 07960
Lord, Noah L., 159–07 Cross Island Pkwy., Beachhurst, N.Y. 11357
Lothrop, Marcus, 68 Post St., San Francisco, Calif. 94104
Loud, Oliver S., 217 Beacon St., Avalon, Calif. 90704
Louis, Benjamin L., 159 Craig St. W., Montreal, Quebec, Canada
Low, Richard, 1060 Broad St., Newark, N.J. 07102
Low, S. Ernest, P.O. Box 772, New Kensington, Pa. 15068
Lowenstein, Harry F., 4625 Windom Pl. N.W. Washington, D.C. 20016
Luc, William L., IBM Corp., P.O. Box 390, Poughkeepsie, N.Y. 12602
Lucyshyn, Peter S., 5700 W. Touhy Ave., Chicago, Ill. 60648
Lutz, Karl B., 653 Racine Ave., Pittsburgh, Pa. 15216
Lyle, Frederick W., 1040 Macon Ave., Pittsburgh, Pa. 15218
Lynch, John J., 64–27 70th St., Middle Village, New York, N.Y. 11379

M

MacCutcheon, Richard H., Suite 100, 11955 Shaker Blvd., Cleveland, Ohio 44120
MacDonald, James M., Massey-Ferguson Ltd., Sun Life Bldg., 200 University Ave., Toronto, Canada
MacDonald, W. Cullen, 59 Maiden Lane, New York, N.Y. 10038
Mack, Prowell S., 1541 Cardinal Court, Winter Park, Fla. 32789
MacLeod, Cameron, 680 Leohard Rd., Berwyn, Pa. 19312
MacMahon, Arthur C., Borden Co., Suite 1802, Borden Bldg., 350 Madison Ave., New York, N.Y. 10017
MacRae, William A., Suite 600, Ottawa Elec. Bldg., 56 Sparks St., Ottawa, Ontario, Canada
Majesko, Raymond T., 1168 Greentree Rd., Pittsburgh, Pa. 15220
Manning, Harold G., 121 Eastfield Rd., Waterbury, Conn. 06708
Marbie, Jarvis C., 36 W. 44th St., New York, N.Y. 11036
Marchionna, Frederick, 4816 47th St. NW., Washington, D.C. 20016
Marcus, Stanley A., Universal Oil Products Co., Suite 405, 2001 Jefferson Davis Hwy., Arlington, Va. 22202
Marder, John F., Sr., Lamington Rd., P.O. Box 171, Bedminster, N.J 07921
Marechal, Greer, Jr., Suite 1209 Bar Bldg., 36 W. 44th St., New York, N.Y. 10036
Markham, John A., Corner of 5th and Adams Sts., Independence, Wis. 54747
Marland, Milton L., 1625 Forest Lane, McLean, Va. 22101
Marmelstein, Nathan, 1336 Missouri Ave. NW., #224, Washington, D.C. 20011
Marshall, Darwin, National Lead Co., 4511 Hyde Park Blvd., Niagara Falls, N.Y. 14305
Martin, Albert C., Udylite Corp., 21441 Hoover Rd., Warren, Mich. 48089
Martin, Edward D., 130 W. Dudley Ave., Westfield, N.J. 07090
Martin, Leyland M., Ladonia, Tex. 75449
Martin, Paul R., 3010 Hopewell Pl., Toledo, Ohio 43604
Martin, William H., Radio Corp. of America, David Sarnoff Res. Center, Princeton, N.J. 08540
Martine, C. E., III, 29 N. Oaks Rd., St. Paul, Minn. 55110
Mason, Dwight N., 640 Brooks St., Missoula, Mont. 59801
Mason, Frederick F., 2610 Bennett Ave., #1, Evanston, Ill. 60201
Mason, James M., Travelers Bldg., 121 Whitney Ave., New Haven, Conn. 06510
Matson, Frederic C., Peoples Trust Co., Cor. Burke and South Queen Sts. Martinsburg, W. Va. 25401
Mau, Edward A., 281 E. Main St., Fredonia, N.Y. 14063
Mayne, Daniel I., 1768 County Line Rd., Fairport, N.Y. 14450
Mayr, Karl A., 781 Palmer Rd., #3F, Bronxville, N.Y. 10708
McBride, John C., Baxter Labs., Inc., 6301 Lincoln Ave., Morton Grove Ill. 60053
McCloskey, Jack W., Chemical Construction Corp., 320 Park Ave., New York, N.Y. 10022
McCurdy, Marion C., International General Elec. Co., 2 Park Ave., Room No. 1010, New York, N.Y. 10016
McDonald, William F., 611 Olive St., St. Louis, No. 63101
McDonnell, Robert J., 500 Marvine Rd., Drexel Hill, Pa. 19026
McEneany, Joseph F., Bell Telephone Labs., Inc., 463 West St., Room No. 759B, New York, N.Y. 10014
McGregor, John C., 80 E. Old Country Rd., Mineola, N.Y. 11501
McKeever, James J., Merck and Co., Inc., Rahway, N.J. 07065
McManamy, Carl D., Dept. of Justice, H.O.L.C., Room No. 137, 101 Indiana Ave. N.W., Washington, D.C. 20530
McNally, John F., Union Carbide Corp., Union Carbide Bldg., 270 Park Ave., New York, N.Y. 10022
Mehlhoff, Ferd L., 708 N. Euclid St., Fullerton, Calif. 92632
Meredith, Trenton, Box 662, Rancho Santa Fe, Calif. 92067
Merrill, Albert H., 24236 N. Arch St., Newhall, Calif. 91321
Meyer, Robert F., P. R. Mallory & Co., Inc., 3029 E. Washington St., Indianapolis, Ind. 46206
Michaels, Joseph D., 7822 Berwick Dr., Garden City, Mich. 48134
Middleton, Walter C., P.O. Box 1168, Cape Coral, Fla. 33904
Miles, Raymond A., 2153–D Daisy Lane, Schenectady, N.Y. 12309
Miller, Kenneth L., Lee Circle, Bryn Mawr, Pa. 19301
Miller, R. Jay, Entwistle Mfg. Corp., 1475 Elmwood Ave., Providence, R.I. 02907
Mills, Lindley E., 518 Pinehurst Blvd., Kalamazoo, Mich. 49007
Misterly, Frank S., Radio Corp. of America, David Sarnoff Res. Center, Princeton, N.J. 08540
Mitchell, Olin V., 78 Shady Brook Lane, Princeton, N.J. 08540
Mohler, Mark, 44 Montgomery St., Suite 2900, San Francisco, Calif. 94104
Molasky, Joseph W., 113 Knollwood Dr., Lansdale, Pa. 19446
Mooney, Edward J., Dow Chemical Co., Pat. Dept., 566 Bldg., Midland, Mich. 48640
Moore, Garnett V., Box 1967, Midland, Mich. 48640
Moran, Joseph P., Babcock & Wilcox Co., 161 E. 42nd St. New York, N.Y. 10017
Morey, Walter T., 243 S. Water, Decatur, Ill. 62523
Morgan, James H., 204 Union Bank Bldg., Fort Worth, Tex. 76102
Morgana, Morley, 949 W. McKinley St., Baton Rouge, La. 70802
Morgenstern, Victor A., 10401 Grosvenor Pl., #714, Rockville, Md. 20852
Morin, Armand G., Sr., Monsanto Res. Corp., 1515 Nicholas Rd., Dayton, Ohio 45407
Morrison, Montford, 742 Clay St., Winter Park, Fla. 32789
Morse, Glenn B., Waters Bldg., Room No. 207, 207 Waters Bldg., Grand Rapids, Mich. 49502
Morton, Craig V., 238 Northview Rd., Dayton, Ohio 45419
Moses, Edmund Q., Sr., 2210 Natl. Association Bldg., 28 W. 44th St., New York, N.Y. 10036
Moss, John J., 11 Beacon St., Boston, Mass. 02108
Motley, Lyle S., Borg-Warner Corp., 200 S. Michigan Ave., Chicago, Ill. 60604
Mott, Monte F., National Aeronautics & Space Admin., 12214 Lakewood Blvd., Downey, Calif. 90241
Moxley, Charles J., Thiokol Chemical Corp., Clearfield, Utah 84016
Mueller, George F., FMC Corp., American Viscose Div., Marcus Hook, Pa. 19061
Mugford, David J., 1230 6th Ave., New York, N.Y. 10020
Mulligan, Rex P., Texaco Development Corp., 135 E. 42nd St., New York, N.Y. 10017
Mumma, Harries A., 8 Hawthorne Rd., Bronxville, N.Y. 10708
Mummert, Frederic H., General Elec. Co., 425 13th St. N.W., Washington, D.C. 20004
Murray, James G., Naval Research Lab., Code 1104, Washington, D.C. 20032
Muschamp, George M., Honeywell Inc., Wayne and Windrim Aves., Philadelphia, Pa. 19104

N

Nardelli, Dominick, 13023 Casimir Ave. S., Gardena, Calif. 90249
Nealon William C., American Optical Co., 14 Mechanic St., Southbridge, Mass. 01550
Newendorp, Terry A., E. I. du Pont de Nemours & Co., Suite 1166, Natl. Press Bldg., 14th and F St. NW., Washington, St. NW., Washington, D.C. 20005
Newman, William J., 3134 Plum Island Dr., Northbrook, Ill. 60062
Nickel, William F., Sunset Ave., East Inogue, L.I., N.Y. 08203
Nielsen, Joseph N., American Bldg., Room No. 906, 1317 F St. N.W., Washington, D.C. 20005
Nieves, Carlos, 950 Evergreen Ave., #17M, New York, N.Y. 10472
Nisbet, John, 618 Peoples National Bank Bldg., Tyler, Tex. 75701
Nobbe, William E., Libbey-Owens-Ford Glass Co., Libbey-Owens-Ford Bldg., 811 Madison Ave., Toledo, Ohio 43624
Noe, Edward T., Jr., 1401 Salem Ave., Dayton, Ohio 45406
Nolan, Frank M., Suite 3611, Woolworth Bldg., 233 Broadway, New York, N.Y. 10007
Nord, Melvin, 17600 Pinehurst, Detroit, Mich. 48221
Norton, Louisa E., 155 E. 44th St., New York, N.Y. 10017
Norton, Raymond J., Suite 300, Denrike Bldg., 1010 Vermont Ave. NW., Washington, D.C. 20005
Norviel, Scott L., Winters Bldg., Room No. 216, 39 W. Adams St., Phoenix, Ariz 85503
Nottingham, William W., Nottingham & Pinto, Esqs., 30 Rockefeller Plaza, New York, N.Y. 10020
Nugent, Andrew J., Western Elec. Co., Inc., 100 Central Ave., Kerny, N.J 07032
Nypaver, Edward W., 1329 N. Forest Rd., #D–35, Williamsville, N.Y. 14221

O

O'Brian, Harold S., Jr., Campbell Soup Co., 375 Memorial Ave., Camden, N.J. 08101
O'Brien, Edmund H., American Home Products Corp., 685 3rd Ave., New York, N.Y. 10017
O'Brien, Walter M., U.S. Naval Research Lab., 4555 Overlook Ave. SW., Washington, D.C. 20032
O'Connell, Jeremiah D., Canada Cement Bldg., Room No. 1018, 606 Cathcart St., Montreal, Quebec, Canada
O'Day, Thomas P., Olin Mathieson Chem. Corp., 275 Winchester Ave., New Haven, Conn. 06500
O'Donnell, Paul E., Jr., 215 Adams St., #5A, Brooklyn, N.Y. 11201
Ogden, David P., Eastman Kodak Co., Kodak Office, 343 State St., Rochester, N.Y. 14650
Ogio, Michael F., Westinghouse Elec. Corp., Pat. Dept., Research & Development Center, Pittsburgh, Pa. 15235
O'Keefe, Ronald W., General Elec. Co., Computer Dept., 13430 N. Black Canyon Hwy., Phoenix, Ariz. 85029
Olcott, Bernard, 200 Park Ave., New York, N.Y. 10017
Oldham, Vernon L., 1510 First National Tower, Room No. 1510, Akron, Ohio 44308
Olsen, Conrad M., Western Electric Co., Hawthorne Station, Chicago, Ill. 60623
Olsen, Rolf Nils, 2704 Harvard Dr., Madison, Wis. 53705
Olson, Arthur A., Sr., 77 W. Washington St., Chicago, Ill. 60602

O—Continued

O'Malley, John R., 3858 S.W. 5th Place, Gainesville, Fla. 32601
Oncken, Mildred, 3600 Wilshire Blvd., Los Angeles, Calif. 90005
Ordway, George A., 2524 S. Atlantic Ave., Daytona Beach, Fla. 32018
Orme, James B. L., 165 Broadway, New York, N.Y. 10006
O'Rourke, Walter P., 320 Colorado Bldg., Washington, D.C. 20004
Oster, Thomas H., Ford Motor Co., Pat. Section, Room 1064, P.O. Box 2053, Dearborn, Mich. 48121
Overocker, Donald J., 71 Camelot Rd., Yarmouth Port, Mass. 02675

P

Paddack, George M., Dept. of Justice, H.O.L.C. Bldg., 101 Indiana Ave. NW., Washington, D.C. 20530
Pallas, Themis C., 31 Hamilton Road, Amber, Pa. 19002
Pallenberg, Joseph C., United States Rubber Tire Co., 6600 E. Jefferson Ave., Detroit, Mich. 48232
Parker, Leo T., 435 Ludlow Ave., Cincinnati, Ohio 45201
Parker, Sheldon H., 93 Charter Circle, Ossining, N.Y. 10562
Pascoli, John W., R.D. #1 McColloch's Addition, Wheeling, W. Va., 26000
Paseler, Frederick E., Monadnock Bldg., 53 W. Jackson Blvd., Chicago, Ill. 60604
Paterson, George, 1630 R St. NW., Washington, D.C. 20009
Patrick, William N., Lear Siegler, Inc., Astronics Div., 3171 S. Bundy Dr., Santa Monica, Calif. 90406
Pearlman, Raymond, General American Transportation Corp., 135 S. La Salle St., Chicago, Ill. 60600
Pearson, Edwin C., 373 W. Mountain Rd., Ridgefield, Conn. 06877
Pearson, Robert D., II, 1025 N. Fernando Blvd., Burbank, Calif. 91504
Peruzzi, Victor M., Victor Stanley, Inc., P.O. Box 93, Dunkirk, Md. 20754
Peters, R. Jonathan, 30 W. Monroe, Chicago, Ill. 60603
Peterson, Gerald H., 12612 Preston Way, Los Angeles, Calif. 90066
Peterson, Richard A., Bldg. 220–12W, 2501 Hudson Rd., St. Paul, Minn. 55119
Peterson, Robert C., 104 Santa Rita Dr., Odessa, Tex. 76760
Peterson, Thomas L., 17092 Aries Dr., Yorba Linda, Calif. 92686
Peterson, Wesley R., Minnesota Mining & Mfg. Co., 220–7E, 2501 Hudson, Rd., St. Paul, Minn. 55119
Petrie, John S., Woodward Bldg., Room No. 922, 15th and H Sts., Washington, D.C. 20006
Petrinec, Robert G., Suite 400, 53 W. Jackson Blvd., Chicago, Ill. 60604
Pfeffer, Martin, Western Electric Co., Inc., P.O. Box 900, Princeton, N.J. 08540
Pfister, Richard A., 530 S. Bennett Ave., Palatine, Ill. 60067
Pfluger, Walter R., Jr., ACF Industries, Inc., 11 Park Place, Parmus, N.J. 07652
Phelps, Edwin, 260 Wood Court, Wilmette, Ill. 60091
Philbin, Stephen H., 277 Park Ave., New York, N.Y. 10017
Phillips, John X., Warner, Bldg., Room No. 1001, 501 13th St. NW., Washington, D.C. 20004
Piggott, Donald J., 800–801 First Natl. Bank Bldg., 1331 G St. NW., Washington, D.C. 20005
Plate, Arthur C., Kroger Bldg., Suite 2236, 1014 Vine St., Cincinnati, Ohio 45202
Poindexter, Paris I., E. I. du Pont de Nemours & Co., Du Pont Bldg., Room No. 7012, 1007 Market St., Wilmington, Del. 19898
Polson, Allen E., Thompson-Apex Co., 505 Central Ave., Pawtucket, R.I. 02862
Poodle, Arthur, St. Andrews House, 31 Mortimer St., London W.1, England
Porter, Herbert H., 1331 G St. NW., Washington, D.C. 20005
Poteat, Robert M., U.S. Atomic Energy Comm., P.O. Box E, Oak Ridge, Tenn. 37831
Powell, Harold N., Tennessee Eastman Co., Bldg. 54D, P.O. Box 511, Kingsport, Tenn. 37662
Powell, John F., 2524 W. Garvey Ave., #10, Alhambra, Calif. 91803
Prather, Jack L., 3754 Congress St., Allentown, Pa. 18100
Prentiss, Augustin M., Sr., 115 Girard Ave., Hartford, Conn. 06100
Prime, Eric B., 4616 Sherwood Ave., Downers Grove, Ill. 60515
Prochnow, Felix E., Ellicott Square Bldg., Room No. 506, Buffalo, N.Y. 14209
Procter, Clifford R., 720 E. Wisconsin Ave., Milwaukee, Wis. 53202
Prouty, Burt L., U.S. Army Electronics Command Patent Agency, Evans Area, Belmar, N.J. 07719
Puishes, Alfons, 712 Grant Bldg., 1095 Market St., San Francisco, Calif. 94103

Q

Quinlan, John C., M. W. Kellogg Co., 711 3rd Ave., New York, N.Y. 10017
Quinn, Cornelius P., 4 Eastern Drive, Wethersfield, Conn. 06109

R

Ragan, Alvin J., 2300 Board of Trade Bldg., 141 W. Jackson Blvd., Chicago, Ill. 60604
Ramsey, William E., 501 Pacific Bldg., Portland, Oreg. 97200
Raphael, Maxwell I., 38 Englewood Ave., Brookline, Mass. 02146
Rebbeck, James W., Box 1967, Midland, Mich. 48640
Recht, Charles H., 212 Thomas St., South Plainfield, N.J. 07080
Reck, James R., Proctor & Gamble Co., Winton Hill Technical Center, Room No. F3A16, 6000 Center Hill Rd., Cincinnati, Ohio 45224
Redman, Charles H., State Bank of St. Charles, Main St., St. Charles, Ill. 60174
Redman, Leslie M., Route 1, Box 177, Santa Fe, N. Mex. 87501
Reeve, William L., 1547 Kingsley Ave., Akron, Ohio 44313
Regan, Harold R., 934 Carolina St., #3, San Francisco, Calif. 94107
Rehm, Roland C., Route 1, Leesburg, Va. 22075
Reif, Charles C., Suite 2005, Rand Tower, 527 Marquette Ave., Minneapolis, Minn. 55402
Reilly, Richard J., Baxter Laboratories, 6301 Lincoln Ave., Morton Grove, Ill. 60053
Reiss, Albert, International Telephone and Telegraph Corp., 320 Park Ave., New York, N.Y. 10022
Rhea, Howard F., 1430 Franklin St., Oakland, Calif. 94612
Rhoads, Charles S., 10705 Francis Drive, Silver Spring, Md. 20902
Riaboff, Alexander, Suite 712 Grant Bldg., 1095 Market St., San Francisco, Calif. 94103
Richards, H. LeRoy, S. C. Johnson & Con, Inc., 1525 Howe St., Racine, Wis. 53403
Richardson, Albert S., Jr., 3 W. Glen Circle, Media, Pa. 19063
Richardson, Arthur L. B., C.I.T. Financial Corp., Room No. 644, 650 Madison Ave., New York, N.Y. 10022
Ringle, William E., 19 Thomas St., Staten Island, N.Y. 10306
Robbin, Leon, P. R. Mallory & Co., Inc., 660 Madison Ave., New York, N.Y. 10021
Roberts, William G., Suite 572 Adams Bldg., 4th and Keeler, Bartlesville, Okla. 74004
Robinson, John P., III, Ling-Temco-Vought Inc., P.O. Box 5907, Dallas, Tex. 75222
Robinson, Kenneth P., Hazeltine Corp., 59–25 Little Neck Pkwy., Little Neck, N.Y. 11362
Robinson, Lynn A., Norton Bldg., Room No. 1502, 801 2nd Ave., Seattle, Wash. 98100
Rodgers, Lionel M., Automatic Signal Division, Laboratory for Electronics, Inc., Regent St., Norwalk, Conn. 06856
Roemer, Irving C., 450 Sansome St., San Francisco, Calif. 94111
Rogers, Robert G., North American Aviation Inc., 3370 Miraloma Ave., Anaheim, Calif. 92803
Rogers, Ross, International Business Machines, 1000 Westchester Ave., White Plains, N.Y. 10604
Rojahn, J. Stetler, Landis Machine Co., 5th and Church Sts., Waynesboro, Pa. 17268
Ronan, John T. III, 330 Madison Ave., New York, N.Y. 10017
Rosen, Albert, Suite 302, 144 S. Beverly Dr., Beverly Hills, Calif. 90210
Rosenberg, Albert, 1701 Eutaw Place, #1–C–C, Baltimore, Md. 21217
Rosenberg, I. Harry, Allied Chemical Corp., 40 Rector St., Room No. 620, New York, N.Y. 10006
Rosenberg, Seymour M., Litton Industries, Inc., 9370 Santa Monica Blvd., Beverly Hills, Calif. 90210
Rosengart, Oliver A., 46 W. 83rd St., #3A, New York, N.Y. 10024
Rosenthal, Joseph F., Department of Justice, Antitrust Div., Dept. of Justice Bldg., Room No. 3119, Washington, D.C. 20530
Rousseau, Norman P., 90 Broad St., New York, N.Y. 10017
Rubin, Sidney, United States Army Electronic Command Patent Agency, Evans Area, Belmar, N.J. 08502
Ruff, Robert T., Cummins Engine Co., Inc., 1000 5th St., Columbus, Ind. 47201
Ruhl, Henry, 7134 Cooper Ave., Glendale, N.Y. 11227
Rusher, Ray, 505 Circle Hill Drive, Arlington Heights, Ill. 60004
Russo, Matthew M., 159 Vanderbilt Ave., Island Park, N.Y. 11558
Ryan, James T., Suite 400, 120 W. Madison, Chicago, Ill. 60602
Ryan, John F., 370 Lexington Ave., New York., N.Y. 10017
Ryan, Joseph A., 103 S. Main St., Pearl River, N.Y. 10965

S

Sackman, Gilbert R., 12 E. 86th St., New York, N.Y. 10028
Sadler, Alfred M., Fuller Co., Bridge St., Catasaqua, Pa. 18032
Sajovec, Frank M., Jr., Eaton Yale & Towne Inc., 100 Erieview Plaza, Cleveland, Ohio 44114
Sanborn, Edgar C., 277 Park Ave., New York, N.Y. 10017
Sanborn, John A., Manufacturers Aircraft Assn. Inc., 45 Rockefeller Plaza, New York, N.Y. 10020
Santantonio, Anthony J., Westinghouse Electric Corp., Churchill Boro, Pittsburgh, Pa. 15235
Scalzo, Joseph R., Sun Oil Co., Box 920, Toledo, Ohio 43601
Schafer, Ivan R., ITE Circuit Breaker Co., 1900 Hamilton St., Philadelphia, Pa. 19130
Schanzle, William F., The Procter & Gamble Co., Ivorydale Technical Center, Cincinnati, Ohio 45217
Scheyer, Emanuel, 2 Carter Ave., Oceanside, L.I., N.Y. 11572
Schnurmacher, Sanford S., 1605 Terminal Tower Bldg., Cleveland, Ohio 44113
Schoedel, Siegfried A., National Press Bldg., Washington, D.C. 20004
Schottler, George J., 60 E. 42nd St., New York, N.Y. 10017
Schrader, Norman E., Xerox Corp., 800 Reynolds Arcade, Rochester, N.Y. 14614
Schubert, Elliot N., 8237 Kilbourn, Skokie, Ill. 60076
Schulze, Richard P., 752 Pennsylvania Bldg., Washington, D.C. 20004
Scott, Clayton M., 4021 Monterey Ave., Minneapolis, Minn. 55416
Seegar, Richard Thompson, The Bendix Corp., 20800 10½ Mile Rd., Southfield, Mich. 48076

S—Continued

Seibel, James E., Heli-Coil Corp., Shelter Rock Lane, Danbury, Conn 06810
Sena, Harry, 515 West End Ave., New York, N.Y. 10024
Shafray, J.A., Perpetual Savings Bldg., 9720 Wilshire Blvd., Beverly Hills, Calif. 90210
Shank, Lloyd P., National Press Bldg., Washington, D.C. 20004
Sharpe, Henry T., Texaco Inc., 135 E. 42nd St., New York, N.Y. 10017
Shealy, Edward M., II, Star Route Box 174a, Alameda, N. Mex. 87114
Sheldon, Louis, 1606 Field Bldg., 135 S. LaSalle, Chicago, Ill. 60603
Shelton, Charles L., United Aircraft Corp., 400 Main St., East Hartford, Conn. 06108
Sherry, Edward N., 11 Gray Oaks Lane, Greenwich, Conn. 06830
Shildneck, Paul R., A. E. Staley Mfg. Co., Decatur, Ill. 62521
Shinn, J. Edward, 12 S. 12th St., Philadelphia, Pa. 19107
Silbereis, Henry, 232 Canterbury Dr., Dayton, Ohio 45429
Sileo, Michael A., Jr., 441 Crestview Circle, Richardson, Tex. 75080
Silver, Charles, 3456 Reisterstown Rd., Baltimore, Md. 21215
Silver, Harold S., Box 31, Route 2, Hartland, Wis. 53029
Simmons, Irving N., Allied Chemical Corp., 61 Broadway, New York, N.Y. 10000
Simmons, William J., Jr., U.S. Army Elec. Command Patent Agency, Main Navy Bldg., Washington, D.C. 20360
Simons, James F., 450 Shabbona, Park Forest, Ill. 60466
Simonton, Robert B., Bristol Labs., Bristol-Myers Co., Syracuse N.Y. 13201
Simpson, Eugene H., 348 Cawker Bldg., 108 W. Wells St., Milwaukee, Wis. 53203
Simpson, John D., 400 Monadnock Bldg., Chicago, Ill. 60604
Sinclair, R. Ronald, 4042 Main St., Upper Marlboro, Md. 20870
Singer, Sheldon J., 1040 Warner Bldg., Washington, D.C. 20004
Sivolobov, Vladimir, 1118 N.E. 14th Ave., Fort Lauderdale, Fla. 33304
Skehan, Jerome F., 108 Summit Ave., Jenkintown, Pa. 19046
Slough, Frank M., 1220 B. F. Keith Bldg., Cleveland, Ohio 44115
Small, James K., 67 Prospect Hill Ave., Summit, N.J. 07901
Smith, Alfred E., AMSC, Army Missile Patent Center, Redstone Arsenal, Ala. 35809
Smith, Arthur D., 1065 Broughton N.W., Orangeburg, S.C. 29115
Smith, Donald P., Box 95214 AF Unit Post Office, Los Angeles, Calif. 90045
Smith, Herbert J., Picatinny Arsenal, Bldg. 3, Dover, N.J. 07801
Smith, James E., 6816 S. Paxton Ave., Chicago, Ill. 60649
Smith, John K., Jr., 1200 Barringer Bldg., 1338 Main, Columbia, S C. 29200
Smith, Roger S., IBM Corp., Patent Operations, P.O. Box 1900, Boulder, Colo. 80302
Smith, Wilbur F., 1270 Wheatsheaf Rd., Roselle, N.J. 07068
Smither, Stanley, 1437 Yonge St., Toronto, Ontario, Canada
Smithers, LeRoy S., Fairchild Camera & Instrument Corp., 300 Robbins Lane, Syosset, N.Y. 11791
Smolka, Paul H., 2005 Palmer Ave., Larchmont, N.Y. 10536
Smoot, John H., 2693 N.E. 22nd St., Pompano Beach, Fla. 33060
Snyder, Alfred J., The Electric Storage Battery Co., 2 Penn Center Plaza, Philadelphia, Pa. 19102
Sobota, Thomas J., P.O. Box 927, Madison, Wis. 53703
Soffian, Warren L., Sun Oil Co., 1608 Walnut St., Philadelphia, Pa. 19103
Spady, James A., 330 Madison Ave., New York, N.Y. 10017
Spangenberg, Charles B., 135 S. LaSalle St., Chicago, Ill. 60603
Sparks, Meredith P., DuPont Bldg., 169 E. Flagler St., Miami, Fla. 33131
Sparks, Thomas, Autonetics, North American Aviation, Miraloma Ave., Anaheim, Calif. 92800
Spector, Saul E., 819 Wash. Loan & Trust Bldg., 900 F St. N.W., Washington, D.C. 20004
Sperry, Alexander T., 711 Candler Bldg., Atlanta, Ga. 30300
Spool, James, 540 Ocean Parkway, Brooklyn, N.Y. 11218
Stahl, John C., P.O. Box 13236, San Antonio, Tex. 78213
Stallings, C. G., Borg-Warner Corp., 2301 E. Vernon Ave., Vernon, Calif. 90054
Stansfield, Joseph Q., Hughes Aircraft Co., Culver City, Calif. 90230
Stauffer, John C., 6031 Burgundy Rd., Dallas, Tex. 75230
Stearns, Orlo F., 3206 Perry St., Mt. Rainier, Md. 20822
Steele, Lynn L., 922 Park Central Bldg., 412 W. 6th St., Los Angeles, Calif. 90014
Stein, Irwin M., One Gateway Center, 420 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
Steininger, Charles F., 904 Ring Bldg., 1200 18th St. NW., Washington, D.C. 20001
Stemple, Dayton R., Jr., 253 Broadway, New York, N.Y. 10007
Sternfels, Lewis B., Hughes Aircraft Co., Bldg. 106, Mail Sta. 1, P.O. Box 90515, Los Angeles, Calif. 90009
Stevens, Jack B., 104 N. St. Asaph St., Alexandria, Va. 22300
Stevens, Raymond H., 900 F St. N.W. Washington, D.C. 20004
Stewart, William P., 735 Park Ave., Apt. 4B, Plainfield, N.J. 07060
Stokes, Charles L., 22924 Bluebird Dr., Calabasas, Calif. 91302
Stokes, James D., Jr., 1049 Washington Bldg., 1345 G St. NW., Washington, D.C. 20005
Stollman, Bernard H., 22100 Greenfield, Detroit, Mich. 48237
Strauss, Harold, 908 Bowen Bldg., 815 15th St. N.W., Washington, D.C. 20005
Strickland, George H., Sr., 712 Third National Bldg., Main St. Dayton, Ohio 45402
Strope, Thom C., The Goodyear Tire & Rubber Co., 1144 Market St., Akron, Ohio 44316
Stryker, John E., First National Bank Bldg., 333–335 Robert St., St. Paul, Minn. 55101
Studwell, Spencer A., 233 Broadway, New York, N.Y. 10007
Styner, Truman L., Navy Electronics Lab., San Diego, Calif. 92106
Swartwood, Kenneth, Ethyl Corp., P.O. Box 341, Baton Rouge, La. 70821
Swenson, George W., 6 Washington Rd., Parlin, N.J. 08859
Swenson, Houston L., 1468 E. 77th St., Indianapolis, Ind. 46240
Szabo, Joseph E., 1 N. LaSalle St., Chicago, Ill. 60602
Szekely, George E., 95 S. Main St., Fort Atkinson, Wis. 53538

T

Taras, Andrew, 10 Davis St., Binghamton, N.Y. 13905
Tate, James R., U.S. Army, Army Material Command, Gen. Counsel Office, Washington, D.C. 20315
Tedesco, Saverio P., 511 Benedict Ave., Tarrytown, N.Y. 10591
Teichmann, Charles F., Texaco Inc., Chrysler Bldg., 135 E. 42nd St., New York, N.Y. 10017
Temin, Morris, 1221 Van Buren St. N.W., Apt. 204A, Washington, D.C. 20012
Temko, Charles E., 545 5th Ave., New York, N.Y. 10017
TeSelle, John, University of Tulsa College of Law, 512 S., Cincinnati, Ohio 74103
Thein, Tab T., 520 5th Ave., New York, N.Y. 10036
Thom, William M., 133 Richmond St. W., Toronto, Ontario, Canada
Thomas, Mark O., The Dole Valve Co., 6201 Oakton St., Morton Grove, Ill. 60053
Thomas, Wilkin E., Jr., E. I. du Pont de Nemours Co., Inc., Market St., Wilmington, Del. 19898
Thomason, Harry E., U.S. Army Materiel Command Hdqrs., Bldg. T–7, Gravelly Point, Va.
Thompson, Joseph J., Kellogg Co., Porter St., Battle Creek, Mich. 49016
Tiernan, John C., Ferro Corp., 4150 E. 56th St., Cleveland, Ohio 44105
Tierney, Samuel, 342 2nd Ave., Chula Vista, Calif. 92010
Tirico, Arthur L., RCA International Div., Rockefeller Center, New York, N.Y. 10000
Toggenburger, John, Olivetti Underwood Corp., 581 Capitol Ave., Hartford, Conn. 06106
Tonne, Chase D., National Distillers & Chem. Corp., 1275 Section Rd., Cincinnati, Ohio 45237
Towle, Harvey L., Westinghouse Elec. Corp., R & D Center, Churchill Boro, Pittsburgh, Pa. 15235
Townsend, Charles E., Jr., 1 Kearny St., San Francisco, Calif. 94108
Toye, F. Gerald, GE Co., 777 14th St. NW., Washington, D.C. 20005
Trabucco, Joseph E., 400 Montgomery St., San Francisco, Calif. 94104
Trachtman, Jacob, 726 Land Title Bldg., Philadelphia, Pa. 19110
Tracy, Leo H., 60 Washington St., Salem, Mass. 01970
Trainer, Marvin L., 10 S. LaSalle St., #1442, Chicago, Ill. 60603
Traylor, William H., Union Federal Bldg., Room No. 600, 45 N. Pennsylvania St., Indianapolis, Ind. 42604
Trenor, William R., Pennsylvania Bldg., Room No. 1312, 425 13th St. NW., Washington, D.C. 20004
Treverton, Richard W., Gleason Works, 1000 University Ave., Rochester, N.Y. 14603
Trotter, Charles H., 1306 Black Friars Road, Baltimore, Md. 21228
Turetsky, Elihu L., Thiokol Chemical Corp., Chemical Division, 780 N. Clinton Ave., Trenton, N.J. 08607
Turin, Henry, Univac Div., Sperry Rand Corp., Sperry Rand Bldg., 1290 Ave. of the Americas, New York, N.Y. 10019
Turnbull, Frederick W., American Bldg., Room 507, 1317 F St. NW., Washington, D.C. 20004
Turner, C. William, Link-Belt Company, Wyatt Bldg., Room No. 427, 777 14th St. NW., Washington, D.C. 20005
Turner, Edwin A., Baker Perkins Inc., 1000 Hess St., Saginaw, Mich. 48605
Turnock, Lawrence C., Jr., Pickands Mather & Co., Union Commerce Bldg., Room No. 2000, Cleveland, Ohio 44115
Tushin, Aaron A., 31 Randlett Park, West Newton, Mass. 01985
Tuska, Clarence D., 401 Mercer Road, Princeton, N.J. 08540
Twesme, Albert L., 113 Davis St., Galesville, Wis. 54630

U

Uhl, William J., Koppers Co. Inc., Koppers Bldg., 7th and Grant St., Pittsburgh, Pa. 15222
Unikel, Alan L., 257 Congressional Lane, #413, Rockville, Md. 20852
Utzler, Elmer S., 1221 Rockwell-Standard Bldg., Pittsburgh, Pa. 15222

V

Van Houten, S. C., Eastman Kodak Co., 343 State St., Rochester, N.Y. 14604
Van Sickler, Robert, 889 National Press Bldg., Washington, D.C. 20004
Venetianer, Stephen, Mobil Oil Corporation, 150 E. 42nd St., New York, N.Y. 10017
Vincent, Roch A., Suite 101, 35 Notre Dame St. W., Montreal 1, Quebec, Canada

V—Continued

Vogel, George T., Room No. 708, 30 E. 42nd St., New York, N.Y. 10017
Volsk, Nicholas T., 9 Arbor Drive, Piedmont, Calif. 94610
Von Maltitz, H., Suite 4410, Lincoln Bldg., 60 E. 42nd St., New York, N.Y. 10017

W

Wade, Worth, Suite 810, 6 Penn Center Plaza, Philadelphia, Pa. 19103
Waite, Donald B., Budd Co., 2450 Hunting Park Ave., Philadelphia, Pa. 19132
Walker, Richard F., 75 Federal St., Boston, Mass. 02118
Wall, Joel, American Optical Corp., 14 Mechanic St., Southbridge, Mass. 01550
Wallace, George H., 1 N. LaSalle St., Room No. 1735, Chicago, Ill. 60602
Wallace, Maxwell V., Parker Rust Proof Div. of Hooker Chemical Corp., 2177 E. Milwaukee Ave., Detroit, Mich. 48211
Waller, Tony L., Suite 200, Law Bldg., 500 W. 7th St., Tulsa, Okla. 74119
Wallick, Earle W., Jr., Electro-Mechanical Research, Inc., Wallace Rd., Princeton Junction, N.J. 08550
Wallin, Thomas N., Monsanto Company, 800 N. Lindbergh Blvd., St. Louis, Mo. 63166
Warburton, Dick M., Sr., Diamond Alkali Company, 300 Union Commerce Bldg., Room No. 320, Euclid Ave. and 9th St., Cleveland, Ohio 44115
Waters, Robert S., 160 E. Habtsdale Ave., #1F, Hartsdale, N.Y. 10530
Weaver, Ernest E., Sr., 632 Summit Ave., Westfield, N.J. 07090
Webb, William T., Manufacturers Aircraft Association, Inc., Munsey Bldg., Room No. 1032, 1329 E. St. N.W., Washington, D.C. 20004
Weber, John R., Anken Chemical & Film Corp., Hix Ave., Newton, N.J. 07860
Weger, Richard E., Suite 105, 586 N. 1st St., San Jose, Calif. 95112
Wiedemann, Warren R., Jr., Sun Oil Company, 1608 Walnut St., Philadelphia, Pa. 19103
Weinberg, Stanley, Westinghouse Electronic Corp., R & D Center, Pittsburgh, Pa. 15235
Weinstein, Warren D., 7811 Underhill Dr., St. Louis, Mo. 63133
Weisbender, Eugene R., Dept. of Justice, Patent Section, Civil Division, 10th and Pennsylvania Ave. NW., Washington, D.C. 20530
Weisz, Paul B., Socony Mobil Oil Co., Inc., Research Department, Paulsboro, N.J. 08066
Weiszmann, Ronald F., 3345 Fillmore St., #101, San Francisco, Calif. 94123
Wells, Joseph H., U.S. Steel Corporation, 525 Wm. Penn Place, Pittsburgh, Pa. 15230
Wendt, Robert H., 7567 Lincoln Ave., Skokie, Ill. 60076
Wenzel, John R., 618 S. 19th St., Arlington, Va. 22202
Werlich, Edgar J., U.S. Atomic Energy Commission, Bldg. D2, 9800 S. Cass Ave., Argonne, Ill. 60439
Werlin, Reuben, Tennessee Bldg., Room No. 2159, 1010 Milam St., Houston, Tex. 77002
Westby, George N., 1148 Spring Hill Rd., McLean, Va. 22101
White, Claron, N., 105 W. Adams, Chicago, Ill. 60603
White, Robert DuWayne, S. C. Johnson & Son, Inc., 1525 Howe St., Racine, Wis. 53400
Whitfield, Harold B., 8657 Rebecca Drive, Williamsville, N.Y. 14221
Whittett, Cameron A., Suite 1550 Monadnock Bldg., 53 W. Jackson Blvd., Chicago, Ill. 60604
Wickes, Lewin W., 1518 Waverly St., Philadelphia, Pa. 19146
Wilken, William A., 2715 Carew Towers, Cincinnati, Ohio 45202
Wilkins, Gordon A., Allied Chemical Corp., 40 Rector St., New York, N.Y 10006
Wilkins, John D., Remington Rand, Div. of Sperry Rand Corp., 60 Wilson Ave., South Norwalk, Conn. 06856
Williams, Harry S., Suite 715 Perpetual Bldg., 1111 E St. N.W., Washington, D.C. 20004
Williams, Noble S., American Optical Company, P.O. Box 1, Southbridge, Mass. 01551
Williams, Thomas N., Richmond Steel Co., Inc., 18th and E. Byrd Sts., P.O. Box 1573, Richmond, Va. 23213
Williamson, George F., 465 Pillsbury Bldg., Northstar Center, Minneapolis, Minn. 55402
Williamson, Harold A., 559 Idlewood Rd., Pittsburgh, Pa. 15235
Wilson, Alfred E., 900 Northland Towers E., Southfield, Mich. 48075
Wilson, Don R., Illinois Tool Works Inc., 2501 N. Keeler Ave., Chicago, Ill. 60600
Wilson, George W., 152 N. Lincoln Place, Monrovia, Calif. 91016
Windham, Ray K., 4885 Edgemoor Lane, Bethesda, Md. 20014
Winokur, Louis L., Union Carbide Corp., Food Products Div., 6733 W. 65th St., Chicago, Ill. 60638
Winter, Lawrence J., 715 15th St. NW., Washington, D.C. 20005
Witter, Lawrie L., 53 State St., Boston, Mass. 02100
Wolfe, William, 3325 161st St. Flushing, N.Y. 11300
Wolffe, Samuel, Suite 300, 2120 L St. NW., Washington, D.C. 20037
Wolfson, Henry M., 146 Argilla Road, Andover, Mass. 01810
Wood, Gordon, 160 Sansome St., San Francisco, Calif. 94104
Wood, Lawrence L., General Electric Company, Suite 1100, Wyatt Bldg., 777 14th St. N.W., Washington, D.C. 20005
Woodhams, Robert E., 2026 Rambling Rd., Kalamazoo, Mich. 49001
Woodruff, Eugene H., Upjohn Company, 301 Henrietta, Kalamazoo, Mich. 49001
Woodson, William T., Suite 3500 Prudential Bldg., 130 E. Randolph, Chicago, Ill. 60601
Woronoff, David S., 40 Sabina Rd., Trumbull, Conn. 06611
Wright, John M., Central Automatic Sprinkler Co., 4th St. and Cannon Ave., Lansdale, Pa. 19446
Wright, Robert O., Williams Steel Wheel & Rim Corp., 1201 Burrstone Rd., Utica, N.Y. 13502
Wyler, Joseph A., Blooming Grove, Hawley, Pa. 18428
Wyman, Alexander, W. R. Grace & Co., Clarksville, Md. 21029

Y

Yamada, Leona C., 905 West End Ave., New York, N.Y. 10025
Yeasting, Maynard C., 1006 United Savings Bldg., Toledo, Ohio 43604
Young, Arthur E., Dow Chemical International, 39 Alfred Escherstrasse, Zurich 2, Switzerland
Young, Leslie B., Sperry & Hutchinson Bldg., 11th Floor, 330 Madison Ave., New York, N.Y. 10017
Young, Llewellyn A., 340 Main St., Lovelock, Nev. 89419
Yungblut, Gibson R., 1215 Provident Tower, Cincinnati, Ohio 45202

Z

Zappala, Richard A., 408 Carlton House, Pittsburgh, Pa. 15219
Zarwell, Elwin J., Suite 300, Stephenson Bldg., 756 N. Milwaukee St., Milwaukee, Wis. 53202
Zaskalicky, Julius J., General Electric Co., Bldg. 1, Electronics Park, Syracuse, N.Y. 13200
Ziegler, Lena R., 510 Sheridan Road, Evanston, Ill. 60202
Zurawsky, Lawrence G., 3316 Jameson Dr., Pittsburgh, Pa. 15227

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

(C.A. Tex.) Lees Patent No. 2,659,212 (62—106), for METHOD OF AND MEANS FOR FORMING FLAKE ICE. *Held* not infringed. *V & S Ice Mach. Co.* v. *Eastex Poultry Co. Inc. et al.*, 437 F.2d 422, 168 UCPQ 389.

(C.A. Ill.) Rockwell Patent No. 2,708,451 (137—620), for GROMMET VALVE MEANS. *Held* claims 1, 8 and 9 invalid and not infringed. *Rockwell et al.* v. *Midland-Ross Corp.*, 438 F.2d 645, 169 USPQ 5.

(C.A. Calif.) Griswold et al. Patent No. 2,710,649 (155—189), for COMBINATION SHOULDER AND LAP SAFETY BELTS. *Held* claims 1–5, 7 and 8 invalid. *Volvo Inc.* v. *Cummings & Sanders, Inc.*, 435 F.2d 981, 168 USPQ 332.

(C.A. Tex.) Lees Patent No. 2,712,534 (260—28.5), for ICE MAKING MACHINE. *Held* invalid. *V & S Ice Mach. Co. Inc.* v. *Eastex Poultry Co. Inc. et al.* 437 F.2d 422, 168 USPQ 389.

(D.C. Fla.) Pohland Patent No. 2,728,779 (260—326.3), for ESTERS OF SUBSTITUTED AMINOBUTANES. *Held* claim 2 valid. *Eli Lilly & Co.* v. *Generix Drug Sales Inc. et al.*, 324 F. Supp. 715, 169 USPQ 13.

(D.C., N.D. Ill., E. Div.) Trow et al Patent No. 2,753,694 (62—106), for ICE DISINTEGRATING AND CHIP DELIVERING SPIRAL ICE CHIP PRODUCING MACHINE. *Held* claim 5 valid and infringed. *King-Seeley Thermos Co.* v. *Reynolds Products, Inc.*, 322 F. Supp. 713, 167 USPQ 519.

(C.A. Ill.) Rockwell Patent No. 2,787,287 (137—620), for FLUID CONTROL VALVE CONSTRUCTION. *Held* claim 1 invalid and not infringed. *Rockwell et al.* v. *Midland-Ross Corp.* 438 F.2d 645, 169 USPQ 5.

(C.A. Ill.) Rockwell Patent No. 2,794,320 (60–54.5), for POWER AUGMENTATION APPARATUS FOR HYDRAULIC MOTOR SYSTEMS. *Held* claim 10 invalid and not infringed. *Id.*

(C.A. Calif.) Stukenborg Patent No. 2,843,408 (287—60), for LOCK FOR TURNBUCKLES. *Held* claims 5–7 invalid and not infringed. *Stukenborg et al.* v. *Teledyne, Inc.*, 441 F.2d 1069, 169 USPQ 584.

(D.C.R.I.) Lewis et al. Patent No. 2,867,001 (18—6), for MEANS AND METHOD FOR FORMING INDICIA ON THE SURFACE OF CONTINUOUS VULCANIZED PRODUCTS. *Held* invalid and not infringed. *Teledyne Mid-America Corp.* v. *International Tel. & Tel. Corp.*, 325 F. Supp. 424, 170 USPQ 9.

(D.C.N.J.) Worthington Patent No. 2,869,460 (101—366), for ROTARY LETTERPRESS INK FOUNTAIN. *Held* invalid and not infringed. *Worthington* v. *Southern New Jersey Newspapers, Inc.*, 323 F. Supp. 443, 167 USPQ 598.

(D.C. Pa.) Hermann et al. Patent No. 2,884,288 (308—213). for NEEDLE ROLLER BEARINGS. *Held* claims 1, 2, 4, 5, 7, 9 and 10 invalid. *Roller Bearing Co. of America* v. *Bearing, Inc.*, 322 F. Supp. 703, 168 USPQ 648.

(C.A. Calif.) Wagner Patent No. 2,934,932 (72—18), for HYDRAULIC CEMENT MORTAR COMPOSITIONS AND METHODS OF USE. *Held* claims 1, 2, and 4 to 9 valid. *Ceramic Tilers Supply Inc.* v. *Tile Council of America, Inc.*, 439 F.2d 1124, 169 USPQ 268.

(C.A.N.Y.) Holtje Patent No. 2,942,172 (321—18), for METHOD OF AND SYSTEM FOR SUPPLYING POWER. *Held* invalid. *General Radio Co.* v. *Kepco, Inc.*, 435 F.2d 135, 168 USPQ 65.

(D.C. Idaho) Stephan Patent No. 2,951,761 (99—3), for FISH BAIT. *Held* claims 1 to 19 valid, claims 1 to 6 and 13 to 19 infringed. *Puget Sound Salmon Egg Co.* v. *Shoshoni, Inc. et al.*, 321 F. Supp. 104, 168 USPQ 154.

(C.A. Ill.) Junkunc Patent No. 2,954,073 (155—125), for FOLDING TABLET ARM CHAIR. *Held* claims 1 to 7, 10, 12, 14 and 15 valid and infringed. *Bela Seating Co.* v. *Poloron Products, Inc.*, 438 F.2d 733, 168 USPQ 548.

(D.C.N.Y.) Lemelson Patent No. 2,962,837 (46—175), for TOY GUN CONTAINING RICOCHET NOISE MECHANISM. *Held* valid but not infringed. *Lemelson* v. *De Luxe Reading Corp. et al.*, 321 F. Supp. 1281, 168 USPQ 636.

(C.A. Calif.) Wagner et al. Patent No. 2,990,382 (260—17), for COMPOSITION COMPRISING HYDRAULIC CEMENT, METHYL CELLULOSE AND RE-EMULSIFIABLE POLYVINYL ACETATE. *Held* claims 1, 2, and 4 to 10 valid. *Ceramic Tilers Supply, Inc.* v. *Tile Council of America, Inc.*, 439 F.2d 1124, 169 USPQ 268.

(D.C.N.Y.) Boivin Patent No. 3,002,868 (154—49), for SPONGE BACK FLOOR COVERING. *Held* not infringed. *Flintkote Co.* v. *Armstrong Cork Co. et al.*, 321 F. Supp. 22, 169 USPQ 165.

(C.A. Ill.) Brandon et al. Patent No. 3,011,213 (18—20), for APPARATUS FOR LUBRICATING MOLD CAVITIES. *Held* invalid. *Magnetics, Inc.* v. *Arnold Engineering Co.*, 438 F.2d 72, 168 USPQ 392.

(D.C.N.Y.) Hubner Patent No. 3,027,507 (320—2), for POWER PACT MEANS FOR ELECTRICAL APPLIANCE. *Held* claims 1 and 7 invalid. *Hubner* v. *Sunbeam Corp.*, 320 F.2d 298, 167 USPQ 227.

(D.C. Ill.) Nelson Patent No. 3,034,311 (62—320), for ICE MAKING APPARATUS. *Held* claim 9 valid and infringed. *King-Seeley Thermos Co.* v. *Reynolds Products, Inc.*, 322 F. Supp. 713, 167 USPQ 519.

(C.A. Ohio) Caplan Patent No. 3,050,087 (138—121), for FLEXIBLE HOSE. *Held* claims 1 and 2 valid and infringed. *H. K. Porter Co.* v. *Goodyear Tire & Rubber Co.*, 437 F.2d 244, 168 USPQ 449.

(C.A.R.I.) Torti Patent No. 3,089,310 (61—41), for TRENCH SHORING MACHINE. *Held* not infringed. *Shields-Jetco, Inc.* v. *Torti*, 436 F.2d 1061, 168 USPQ 385.

(C.A. Ill.) Edwards Patent No. 3,091,360 (220—97), for NESTABLE CUP. *Held* infringed. *Illinois Tool Works, Inc.* v. *Sweetheart Plastics, Inc.*, 436 F.2d 1180, 168 USPQ 451.

(D.C.N.Y.) Goldstein et al. Patent No. 3,096,224 (154—45.9), for CORRUGATED PAPER BOARD PRODUCT. *Held* claims 1 to 3 invalid. *Tri-Wall Containers, Inc.* v. *Continental Can Co., Inc.*, 323 F. Supp. 700, 169 USPQ 212.

(C.A. Calif.) Holsman Patent No. 3,175,330 (50—165), for BEAD FOR PLASTER, STUCCO AND THE LIKE. *Held* claims 1 and 4 invalid. *Stockton Wire Products, Inc.* v. *K-Lath Corp.*, 440 F.2d 782, 169 USPQ 327.

(C.A. Tex.) Kelly Patent No. 3,185,228 (175—410), for ROTARY-PERCUSSION DRILL BIT WITH HEEL ROW INSERTS TO PREVENT WEDGING. *Held* claims 3 and 7 invalid. *Hughes Tool Co.* v. *Ingersoll-Rand Co.*, 437 F.2d 1106, 168 USPQ 545.

(D.C. Idaho) McDonald Patent No. 3,193,300 (280—11.37), for SKI POLE RINGS. *Held* claims 1–7 invalid. *Scott U.S.A., Inc.* v. *McDonald*, 321 F. Supp. 339, 167 USPQ 526.

(C.A. Ohio) Caplan Patent No. 3,194,705 (156—143), for METHOD AND APPARATUS FOR MAKING REINFORCED CORRUGATED HOSE. *Held* claims 1 to 3, 5, 6 and 13 to 16 valid and infringed. *H. K. Porter Co.* v. *Goodyear Tire & Rubber Co.*, 437 F.2d 244, 168 USPQ 449.

(D.C. Minn.) Foote et al. Patent No. 3,217,648 (102—42), for COMBINATION WAD COLUMN AND SHOT LINER. *Held* claim 1 invalid and not infringed. *Remington Arms Co.* v. *Herter's, Inc.*, 324 F. Supp. 760, 169 USPQ 805.

(C.A. Ill.) Eyberger Patent No. 3,244,782 (264—11), for TOROIDAL CORE PRESSURE FORMING METHOD. *Held* void because of public use. *Magnetics, Inc.* v. *Arnold Engineering Co.*, 438 F.2d 72, 168 USPQ 392.

(D.C. Mich.) Jendrisak Patent No. 3,103,430 (65—290), for GLASS BENDING APPARATUS. *Held* claims 1, 3 and 7 invalid. *Shatterproof Glass Corp.* v. *Guardian Glass Co. Inc.*, 322 F. Supp. 854, 168 USPQ 212.

(C.A. Ill.) Fredman Patent No. 3,118,151 (5—238), for ONE-PIECE BELT-TYPE BEDDING CARRIER. *Held* claim 3 invalid, claim 4 not infringed. *Fredman* v. *Harris-Hub Co., Inc.*, 442 F.2d 210, 169 USPQ 768.

(C.A. Fla.) Kardulas Patent No. 3,128,882 (211—13), for HAIR ROLLER HOLDER. *Held* invalid for lack of invention. *Kardulas* v. *Florida Mach. Products Co.*, 438 F.2d 118, 168 USPQ 673.

(C.A. Ill.) Edwards Patent No. 3,139,213 (220—97), for NESTABLE CUP. *Held* valid and enforceable. *Illinois Tool Works, Inc.* v. *Sweetheart Plastics, Inc. et al.*, 436 F.2d 1180, 168 USPQ 451.

(D.C. Ill.) Kalke Patent No. 3,156,541 (34—181), for APPARATUS FOR STIRRING GRAIN AND SIMILAR PARTICULATE MATERIAL. *Held* claims 3 and 4 valid and infringed. *David Mfg. Co. et al.* v. *Specialized Products, Inc. et al.*, 324 F. Supp. 588, 168 USPQ 511.

(D.C. Del.) Omholt Patent No. 3,271,916 (52—393), for UNIFORM RESILIENT FLOORING SYSTEMS. *Held* invalid. *Powerlock Floors, Inc.* v. *Robbins Flooring Co. Inc.*, 327 F. Supp. 388, — USPQ —.

(D.C. Ill.) Hansen et al. Patent No. 3,285,752 (99—107), for METHOD OF PREPARING A POULTRY PRODUCT. *Held* invalid and not infringed. *Armour & Co.* v. *Swift & Co.*, 320 F. Supp. 433, 168 USPQ 269.

(D.C. Calif.) Norwood Patent No. 3,304,435 (250—237), for PHOTOMETRIC DEVICE HAVING GREATER RESPONSE TO A PREFERENTIAL CENTRAL PORTION OF A SCENE. *Held* claims 1–4, 6, 7 and 9 invalid and not infringed. *Norwood* v. *Ehrenreich Photo-Optical Industries Inc.*, 322 F. Supp. 898, 168 USPQ 73.

(D.C. Calif.) Glass et al. Patent No. 3,325,981 (56—23), for HAY HARVESTING MACHINE. *Held* invalid. *Deere & Co.* v. *Sperry Rand Corp.*, 322 F. Supp. 397, 168 USPQ 150.

(C.A. Tex.) Stamps et al. Patent No. 3,326,232 (239—10), for FERTILIZER APPLICATION AND APPARATUS THEREFOR. *Held* not infringed. *Inject-O-Meter Mfg. Co.* v. *North Plains Fertilizer & Chemical, Inc.*, 439 F.2d 1138, 169 USPQ 70.

(D.C. Ill.) Perry Patent No. 3,335,092 (252—158), for OVEN CLEANER AND METHOD OF USING THE SAME. *Held* invalid. *Shelco, Inc.* v. *Dow Chemical Co.*, 322 F. Supp. 485, 168 USPQ 395.

(D.C. Ala.)Pyke et al. Patent No. 3,341,955 (38—144), for PRODUCING WRINKLE-FREE PERMANENTLY CREASED GARMENTS. *Held* invalid. *Everprest, Inc.* v. *Phillips-Van Heusen Corp.*, 325 F. Supp. 1293, 168 USPQ 489.

(C.A. Oreg.) Silvey Patent No. 3,349,645 (76—40), for SAW CHAIN GRINDING MACHINE. *Held* invalid. *Silvey* v. *Nielsen Corp.*, 437 F.2d 1159, 168 USPQ 679.

(D.C. Calif.) McCarty et al. Patent No. 3,375,643 (56—23), for HARVESTING DEVICE. *Held* invalid. *Deere & Co.* v. *Sperry Rand Corp.*, 322 F. Supp. 397, 168 USPQ 150.

(C.A. Tex.) Stamps et al. Patent No. 3,375,976 (239—10), for FERTILIZER APPLICATION PROCESS. *Held* invalid for obviousness. *Inject-O-Meter Mfg. Co.* v. *North Plains Fertilizer & Chemical, Inc.*, 439 F.2d 1138, 169 USPQ 70.

(D.C. Calif.) Glass et al. Patent No. 3,383,844 (56—23), for DEFLECTOR STRUCTURE. *Held* invalid. *Deere & Co.* v. *Sperry Rand Corp.*, 322 F. Supp. 397, 168 USPQ 150.

(D.C. Calif.) Glass et al Patent No. 3,386,233 (56—23), for IMPLEMENT FRAME. *Held* invalid. *Id.*

(C.A. Tex.) Sanderson et al. Patent No. 3,397,522 (56—30), for COTTON HARVESTER. *Held* claims 15, 16, 18 and 19 invalid. *Deere & Co.* v. *Hesston Corp. et al.*, 440 F.2d 904, 169 USPQ 132.

(D.C. Ohio) Cheney et al. Patent No. 3,421,290 (55—101), for INDOOR SMOKE REMOVAL SYSTEM. *Held* invalid. *Enviro Air, Inc.* v. *United Air Specialists, Inc.*, 322 F. Supp. 633, 168 USPQ 91.

(C.A. Ill.) Eyberger Reissue Patent No. 25,441 (18—42), for PRESSURE FORMING APPARATUS. *Held* void because of public use. *Magnetics Inc.* v. *Arnold Engineering Co. et al.*, 438 F.2d 72, 168 USPQ 392.

(D.C. Fla.) Brose Reissue Patent No. 26,368 (152—370), for TIRE REPAIR INSERT. *Held* claims 1, 11, 14 and 16 valid, but not infringed. *Brose* v. *Sears, Roebuck & Co. et al.*, 326 F. Supp. 1015, 168 USPQ 497.

Dedications

2,715,562.—*John F. Les Veaux*, Middleport, N.Y. INSECTICIDAL CALCIUM ARSENATE AND METHOD OF MAKING SAME. Patent dated Aug. 16, 1955. Dedication filed Nov. 4, 1971, by the assignee, *FMC Corporation*.

Hereby dedicates to the Public the remaining term of said patent.

2,715,599.—*John F. Les Veaux*, Middleport, and *Calvin M. Tidwell*, Medina, N.Y. METHOD OF MAKING INSECTICIDAL CALCIUM ARSENATE BATCH. Patent dated Aug. 16, 1955. Dedication filed Nov. 4, 1971, by the assignee, *FMC Corporation*.

Hereby dedicates to the Public the remaining term of said patent.

2,758,955.—*Oscar H. Johnson*, South Charleston, and *Allan M. Harvey*, Charleston, W. Va., and *Harry West*, Middleport, N.Y. PROCESS OF PROTECTING ORGANIC MATTER AGAINST FUNGUS GROWTH BY APPLYING A CHLORINE SUBSTITUTED THIA- OR DIHYDROTHIANAPHTHENE DIOXIDE. Patent dated Aug. 14, 1956. Dedication filed Nov. 4, 1971, by the assignee, *FMC Corporation*.

Hereby dedicates to the Public the remaining term of said patent.

2,786,009.—*John A. Pianfetti*, Charleston, and *Oren F. Williams*, and *James Forrest Allen*, South Charleston, W. Va. INSECTICIDAL COMPOSITIONS COMPRISING CARBONYL BISDITHIOPHOSPHATE COMPOUNDS AND METHOD OF APPLYING THE SAME. Patent dated Mar. 19, 1957. Dedication filed Nov. 4, 1971, by the assignee, *FMC Corporation*.

Hereby dedicates to the Public the remaining term of said patent.

2,841,520.—*Joe R. Willard* and *John F. Henahan*, Middleport, N.Y. PESTICIDAL PHOSPHORUS ESTERS. Patent dated July 1, 1958. Dedication filed Nov. 4, 1971, by the assignee, *FMC Corporation*.

Hereby dedicates to the Public the remaining term of said patent.

3,264,536.—*Harold B. Robinson*, Chatham, N.J., and *David J. Valley*, Cleveland, Ohio. CAPACITOR WITH A POLYARYLENE POLYETHER DIELECTRIC. Patent dated Aug. 2, 1966. Dedication filed Jan. 25, 1972, by the assignee, *Union Carbide Corporation*.

Hereby dedicates to the Public the remaining term of said patent.

Disclaimers

2,629,827.—*John Presper Eckert, Jr.* and *John W. Mauchly*, Philadelphia, Pa. MEMORY SYSTEM. Patent dated Feb. 24, 1953. Disclaimer filed Nov. 3, 1971, by the assignee, *Sperry Rand Corporation*.

Hereby enters this disclaimer to claims 1, 2, 3 and 30 of said patent.

2,862,369.—*Edward W. Simons*, San Francisco, Calif. AIR CONDITIONED DISPLAY COMPARTMENT AND METHOD. Patent dated Dec. 2, 1958. Disclaimer filed Nov. 24, 1971, by the assignee, *Dualjet Corporation*.

Hereby enters this disclaimer to claims 1, 3, 4, 8, 9 and 10 of said patent.

3,136,248.—*James R. Anderson*, Winnetka, Ill. PROCESS AND APPARATUS FOR TEMPORARILY INDICATING CORRECTIONS IN TEXT OF PRINTED MATTER. Patent dated June 9, 1964. Disclaimer filed Oct. 27, 1971, by the assignee, *La Salle Street Press, Incorporated*.

Hereby enters this disclaimer to claim 2 of said patent.

3,223,587.—*Samuel Wilkinson*, London, England. CARDIAC ACTIVE ACYL CYMAROLS. Patent dated Dec. 14, 1965. Disclaimer filed Nov. 19, 1971, by the assignee, *Burroughs Wellcome Co.*

Hereby enters this disclaimer to claims 5 and 6 of said patent.

3,227,554.—*Charles R. Barr, John Williams*, and *Keith E. Whitmore*, Rochester, N.Y. PHOTOGRAPHIC ELEMENTS AND PROCESSES UTILIZING MERCAPTAN-FORMING COUPLERS. Patent dated Jan. 4, 1966. Disclaimer filed Nov. 5, 1971, by the assignee, *Eastman Kodak Company*.

Hereby enters this disclaimer to claims 1, 2, 6, 7, 8, 9, 10, 15, 17, 18, 20, 22, 28, 29 and 30 of said patent.

3,301,541.—*Harold N. Ipsen*, Rockford, Ill. HEAT TREATING FURNACE WITH CIRCULATED GAS QUENCH. Patent dated Jan. 31, 1967, Disclaimer filed Nov. 5, 1971, by the assignee, *Alco Standard Corporation*.

Hereby enters this disclaimer to all the claims of said patent.

3,304,739.—*Edward H. Erath*, Los Angeles, Calif. COOLING SYSTEM FOR PASSENGER COMPARTMENTS OF VEHICLES. Patent dated Feb. 21, 1967. Disclaimer filed Oct. 26, 1971, by the assignee, *McDonnell Douglas Corporation*.

Hereby enters this disclaimer to claim 1 of said patent.

3,324,553.—*John V. Borden*, Washington, D.C. DENTAL HANDPIECE. Patent dated June 13, 1967. Disclaimer filed Nov. 26, 1971, by the inventor.

Hereby enters this disclaimer to claims 15, 34, 35, 37 and 38 of said patent.

3,368,972.—*Ferdinand P. Otto*, Woodbury, N.J. HIGH MOLECULAR WEIGHT MANNICH BASES AS ENGINE OIL ADDITIVES. Patent dated Feb. 13, 1966. Disclaimer filed Oct. 22, 1971, by the assignee, *Mobil Oil Corporation*.

Hereby enters this disclaimer to claim 6 of said patent.

3,386,855.—*Addison B. Scholes*, Muncie, Ind. LUBRICOUS COATING FOR GLASS. Patent Dated June 4, 1968. Disclaimer filed Nov. 12, 1971, by the assignee, *Ball Corporation*.

Hereby enters this disclaimer to claims 8 and 9 of said patent.

3,420,693.—*Addison B. Scholes*, Muncie, and *John E. Pickard*, Selma, Ind. GLASS HAVING DUAL PROTECTIVE COATINGS THEREON AND A METHOD FOR FORMING SUCH COATINGS. Patent dated Jan. 7, 1969. Disclaimer filed Nov. 12, 1971, by the assignee, *Ball Corporation*.

Hereby disclaims the portion of the term of the patent subsequent to Nov. 14, 1984.

3,441,761.—*Richard Clarence Painton* and *Clarence Albert Burke*, Rochester, N.Y. IRONLESS ROTOR FOR ELECTRIC MOTOR. Patent dated Apr. 29, 1969. Disclaimer filed Dec. 7, 1971, by the assignee, *Eastman Kodak Company*.

Hereby enters this disclaimer to claims 5 and 7 of said patent.

3,451,493.—*James C. Storm*, Corpus Christi, Tex. DRILLING APPARATUS AND METHOD. Patent dated June 24, 1969. Disclaimer filed Dec. 10, 1971, by the inventor.

Hereby enters this disclaimer to claims 27, 34 and 41 of said patent.

3,485,814.—*Stanley Brooke Speck*, Wilmington, Del. DISAZO SULFONIC ACID DYES. Patent dated Dec. 23, 1969. Disclaimer filed Dec. 9, 1971, by the assignee, *E. I. du Pont de Nemours and Company*.

Hereby enters this disclaimer to claims 1, 2 and 3 of said patent.

3,525,171.—*Harry S. Gilman*, Marblehead, Mass. DISPLAY MEANS. Patent dated Aug. 25, 1970. Disclaimer filed Dec. 2, 1971, by the inventor.

Hereby enters this disclaimer to the remaining term of said patent.

3,537,363.—*George E. Long*, Monroe, and *Howard G. Anson*, Seattle, Wash. SERVO-CONTROLLED HYDRAULIC SYSTEM. Patent dated Nov. 3, 1970. Disclaimer filed Jan. 17, 1972, by the inventors.

Hereby enters this disclaimer to claims 1, 5 and 7 of said patent.

3,579,198.—*John A. Giunta*, Long Branch, N.J. MICROPROGRAMMED WIRED LOGIC MEMORY. Patent dated May 18, 1971. Disclaimer filed Dec. 6, 1971, by the assignee, *Bell Telephone Laboratories, Incorporated*.

Hereby enters this disclaimer to claim 10 of said patent.

3,606,418.—*Paul S. Buker, Richard D. Shepard* and *David P. Wenaas*, Middletown, Ohio. STRUCTURAL MEMBER. Patent dated Sept. 20, 1971. Disclaimer filed Nov. 4, 1971, by the assignee, *Armco Steel Corporation*.

Hereby enters this disclaimer to claim 1 of said patent.

Disclaimers and Dedications

3,068,528.—*John Edward Owens*, Wilmington, Del. METHOD FOR CONVEYING AND STRETCHING THERMOPLASTIC FILM. Patent dated Dec. 18, 1962. Disclaimer and dedication filed Nov. 11, 1971, by the assignee, *E. I. du Pont de Nemours and Company*.

Hereby enters this disclaimer to all remaining claims in said patent and dedicates said patent to the Public.

3,363,862.—*Harold Lee Walter* and *Jean Arthur Malthaner*, San Diego, Calif. VARIABLE CAMBER LONGITUDINAL CONTROL SYSTEM FOR AIRCRAFT. Patent dated Jan. 16, 1968. Disclaimer and dedication filed Nov. 1, 1971, by the assignee, *General Dynamics Corporation*.

Hereby enters the disclaimer to claims 1–15 and dedicates said patent to the Public.

Certificates of Correction for the Week of Mar. 7, 1972

Re. 27,148	3,582,700	3,597,378	3,603,882
Re. 27,182	3,582,927	3,597,571	3,603,911
3,482,525	3,583,194	3,597,639	3,604,285
3,489,901	3,583,196	3,597,931	3,604,299
3,506,724	3,583,280	3,597,950	3,604,349
3,527,773	3,583,439	3,597,955	3,604,613
3,528,479	3,583,763	3,598,096	3,604,629
3,532,499	3,584,018	3,598,333	3,604,923
3,534,274	3,586,505	3,598,476	3,605,063
3,545,683	3,586,521	3,598,705	3,605,297
3,551,678	3,587,011	3,598,807	3,605,475
3,552,031	3,587,162	3,599,079	3,605,851
3,552,553	3,588,431	3,599,288	3,605,892
3,554,185	3,588,755	3,599,330	3,606,273
3,554,284	3,589,521	3,599,461	3,606,313
3,554,648	3,589,555	3,599,468	3,606,356
3,554,758	3,590,036	3,599,840	3,606,657
3,556,791	3,590,154	3,600,039	3,606,721
3,556,844	3,590,275	3,600,318	3,606,753
3,557,284	3,590,628	3,600,359	3,607,009
3,557,992	3,590,915	3,600,396	3,607,057
3,558,947	3,591,323	3,600,513	3,607,064
3,560,477	3,591,674	3,600,524	3,607,112
3,561,705	3,591,679	3,601,191	3,607,132
3,562,313	3,592,160	3,601,212	3,607,242
3,562,669	3,592,687	3,601,531	3,607,416
3,566,774	3,592,885	3,601,600	3,607,733
3,567,693	3,593,337	3,601,631	3,607,908
3,568,816	3,593,543	3,601,699	3,608,076
3,569,774	3,593,858	3,601,850	3,608,090
3,569,840	3,594,008	3,601,878	3,608,277
3,570,446	3,594,056	3,601,942	3,608,689
3,571,996	3,594,353	3,602,200	3,608,782
3,573,772	3,595,277	3,602,225	3,609,241
3,574,009	3,595,556	3,602,229	3,609,407
3,575,040	3,595,759	3,602,304	3,609,445
3,576,607	3,595,784	3,602,367	3,609,460
3,576,830	3,595,831	3,602,697	3,610,077
3,578,082	3,595,910	3,602,753	3,610,945
3,579,520	3,595,977	3,602,781	3,611,496
3,580,407	3,596,559	3,602,821	3,611,550
3,580,616	3,597,044	3,603,410	3,611,732
3,581,861	3,597,233	3,603,474	3,614,922
3,582,600	3,597,297	3,603,880	3,620,552

PATENT EXAMINING CORPS

R. A. WAHL, Assistant Commissioner
F. H. BRONAUGH, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF FEBRUARY 8, 1972

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—M. STERMAN, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	1-06-71
GENERAL ORGANIC CHEMISTRY, GROUP 120—I. MARCUS, Director. Heterocyclic; Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	8-04-70
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—L. J. BERCOVITZ, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	10-23-70
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 150—A. P. KENT, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	1-25-71
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—W. B. KNIGHT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	8-10-70
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS AND RELATED ELEMENTS, GROUP 210—N. ANSHER, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Miscellaneous.	6-08-71
SECURITY, GROUP 220—R. L. CAMPBELL, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	8-20-70
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	2-03-71
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—W. L. CARLSON, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	3-04-71
PHYSICS, GROUP 260—R. L. EVANS, Director. Photography; Sound and Lighting; Indicators and Optics; Measuring and Testing; Geometrical Instruments.	1-04-71
DESIGNS, GROUP 290—R. L. CAMPBELL, Director. Industrial Arts; Household, Personal and Fine Arts.	1-04-71
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—A. BERLIN, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Railways and Railway Equipment; Brakes; Rigid Flexible and Special Receptacles and Packages.	1-06-71
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—D. J. STOCKING, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders Woodworking; Tools; Cutlery; Jacks.	12-08-70
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—A. RUEGG, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	12-02-70
HEAT, POWER AND FLUID ENGINEERING, GROUP 340—M. M. NEWMAN, Director. Power Plants; Combustion Engines; Fluid Motors; Pumps; Turbines; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Vaporizing; Temperature and Humidity Regulation; Machine Elements; Power Transmission; Fluid Handling; Lubrication; Joint Packing.	2-11-71
CONSTRUCTIONS, SUPPORTS, TEXTILES, CLEANING, GROUP 350—T. J. HICKEY, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Receptacles; Supports; Cabinet Structures; Centrifugal Separations; Cleaning; Coating; Pressing; Agitating; Foods; Textiles; Apparel and Shoes; Sewing Machines; Winding and Reeling.	1-04-71

Expiration of patents: The patents within the range of numbers indicated below expire during February 1972, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,700,764 to 2,702,900, inclusive
Plant Patents..... Numbers 1,345 to 1,354, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED MARCH 7, 1972

Published at the request of the applicant or owner in accordance with Notice of Apr. 11, 1968, 849 O.G. 1221. The abstracts are identified by serial number of the applications and arranged in chronological order. The heading of each abstract of application published herein indicates the number of pages of specification, including claims and sheets of drawing contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Applications published under the Defensive Publication Program have not been examined as to the merits of alleged invention. The Patent Office makes no assertion as to the novelty of the disclosed subject matter.

T896,001
HIGH PURITY POLYESTER DEPOLYMERIZATION PRODUCTS FROM POLYESTER SCRAP BY COMPLETE HYDROGENATION

George Miller Stevenson, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of application Ser. No. 676,724, Oct. 20, 1967. This application Nov. 24. 1969, Ser. No. 873,728
Int. Cl. C07c *35/02;* C08g *17/08*
U.S. Cl. 260—617C
No Drawing. 15 Pages Specification

A substantially colorless cyclohexanedimethanol solution is produced by depolymerizing scrap polyesters of difunctional glycols and difunctional aromatic dicarboxylic acids in the presence of a C_2 to C_8 aliphatic alcohol at a temperature of at least about 125° C. so as to obtain a depolymerized reaction product comprising a diester, subjecting the diester to a first catalytic hydrogenation reaction under conditions sufficient to saturate the aromatic ring of the diester, and then subjecting the resulting diester to a second catalytic hydrogenation reaction under conditions sufficient to reduce the ester groups and to produce the substantially colorless cyclohexanedimethanol.

T896,002
FRICTIONAL COMPOSITIONS

Paul H. Richard, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 27, 1970, Ser. No. 32,449
Int. Cl. C09d *3/78;* F16d *13/60*
U.S. Cl. 117—161 UF
No Drawing. 9 Pages Specification

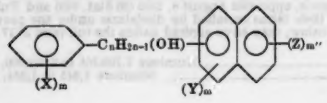
Standard frictional compositions such as brake and friction clutch materials, having a multiplicity of surface pores ranging from 1 to 100 microns in size when modified by impregnating the pores with a solid polymer of tetrafluoroethylene, having a molecular weight of at least 2000 and a melting point of at least 265° C., demonstrate improved resistance to high temperature fading and noise. The polymers are conveniently applied as dispersions in liquids such as tertiary hydrocarbons, aliphatic ethers and alcohols and the like with the polymer particle size ranging between about 0.1 and 50 microns. A standard frictional composition can be composed of, for example, rubber dust, asbestos and an adhesive binder.

T896,003
BACTERIOSTATIC ARALKANOLS

Joseph W. Baker, 421 Greenleaf St. 63122, and Ignatius Schumacher, 1009 S. Elm 63119, both of St. Louis, Mo.

Filed May 11, 1970, Ser. No. 36,383
Int. Cl. C07c *31/14*
U.S. Cl. 260—618 R
No Drawing. 7 Pages Specification

Certain aralkanols represented by the formula



wherein:

C_nH_{2n-1} is a saturated hydrocarbon chain;
n represents an integer selected from 1 to 4;
X, Y and Z individually represent chloro, bromo or nitro; and
m, m' and m'' each represent an integer selected from 0 to 3, provided that the sum of $m+m'+m''$ equals at least 2,

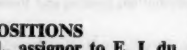
are prepared by reacting a naphthaldehyde with a Grignard reagent. The aralkanols effectively control the growth of gram-positive microorganisms.

T896,004
COMPOSITION OF MATTER AND METHOD

Adel F. Halasa, 1568 Larch St., Akron, Ohio 44301

Continuation of application Ser. No. 868,647, Oct. 22, 1969. This application July 13, 1970, Ser. No. 56,212
Int. Cl. C08f *27/06*
U.S. Cl. 260—79.5 B
No Drawing. 10 Pages Specification

N,N - diisopropylthiocarbamyl - N,N' - dimethylsulfenamide in an accelerator of the vulcanization of diolefin rubbers, including butadiene-styrene, polybutadiene and polyisoprene rubbers, said sulfenamide represented by the structure



T896,005
SANDWICH WIRE COATING CONSTRUCTION

Joseph F. Parsons, Folcroft, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of application Ser. No. 755,394, Aug. 26, 1968. This application Aug. 19, 1970, Ser. No. 65,288
Int. Cl. B44d *1/16, 1/18*
U.S. Cl. 117—218
No Drawing. 6 Pages Specification

A multi-layered sandwich insulating construction in which a low thermally rated enamel is sandwiched between thin upper and lower layers of a polyimide is provided for use as an electrical insulating material for electrical conductors.

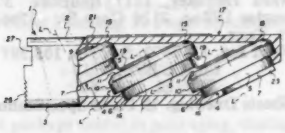
T896,006
ANTISTATIC POLYOLEFIN COMPOSITION

Alan B. Glanvill, "Broad Hinton" Beechfield Road, Alderley Edge, Cheshire, England

Filed Sept. 28, 1970, Ser. No. 76,322
Claims priority, application Great Britain, Sept. 30, 1969, 47,941/69
Int. Cl. C08f *29/02, 29/04, 37/00*
U.S. Cl. 260—93.7
No Drawing. 12 Pages Specification

Effectiveness of antistatic additives such as hydroxyalkyl substituted amines and long chain fatty acid amides in polyolefins is improved by incorporating therein a C_{12}–C_{20} aliphatic alcohol.

T896,007
BATTERY HOLDER
Jeffrey R. Stoneham and Benjamin B. Adams, both of 901 Elmgrove Road, Rochester, N.Y. 14650
Filed Sept. 30, 1970, Ser. No. 76,836
Int. Cl. H01m *1/04*
U.S. Cl. 136—173
2 Sheets Drawing. 12 Pages Specification



A holder for disc-like electrical batteries includes a set of support surfaces for engaging the side and end walls of a plurality of the batteries to position them in a shingled relationship.

T896,008
ESTERS OF 4-METHYLCYCLOHEXANE-METHANOL
David L. Valentine, 4508 Chickasaw Road, Kingsport, Tenn. 37664
Filed Oct. 5, 1970, Ser. No. 78,297
Int. Cl. C07c *69/80*
U.S. Cl. 260—475 R
No Drawing. 15 Pages Specification

Esters of 4-methylcyclohexanemethanol are useful as plasticizers for vinyl polymers. The esters may be synthesized from 4-methylcyclohexanemethanol alone or in combination with other alicyclic or aliphatic alcohols, and dicarboxylic acids or anhydrides thereof.

T896,009
HIGH FRICTION ARTICLE BASED ON A POLYIMIDE RESIN
Frank Clyde Starr, Jr., Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
Continuation of application Ser. No. 711,487, Mar. 8, 1968, which is a continuation-in-part of abandoned application Ser. No. 415,458, Dec. 2, 1964. This application Oct. 19, 1970, Ser. No. 82,118
Int. Cl. C08g *51/10, 51/12*
U.S. Cl. 260—37 N
No Drawing. 18 Pages Specification

A molded article especially adapted for use as high-friction articles such as brake linings, is provided wherein the molded article is characterized by a co-efficient of friction of from 0.4 to 0.8 and a wear constant of at least 50, and consists of between about 20% and about 60% by weight of a linear aromatic polyimide resin, from between about 15% and about 50% by weight of a fibrous filler such as asbestos fibers, from between about 5% and about 20% of a metal such as copper in elongated form, from between about 2% and about 10% of an abrasive filler such as aluminum oxide in a silicon-containing dispersion wherein said abarsive is characterized by a hardness of at least about 8 on the Moh scale, and up to about 25% by weight of a siliceous glass.

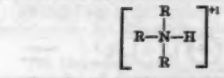
T896,010
EMULSIONS AND USES THEREOF
Wayne W. Lochmaier, 312 Hamilton Drive, Kingsport, Tenn. 37663
Filed Nov. 18, 1970, Ser. No. 90,811
Int. Cl. C09k *3/28*
U.S. Cl. 117—136
No Drawing. 20 Pages Specification

A process where an emulsion containing a flame retarder is applied to the surface of a polyester fiber and the fiber is subsequently heated to diffuse the flame retarder into the fiber. The emulsion consists essentially of:

(A) water,

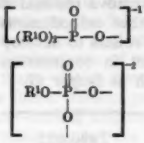
(B) an emulsifier system which is a positive and negative ion in dissociation equilibrium wherein:

(1) the positive ion is an alkali metal ion, or an ion corresponding to the structure

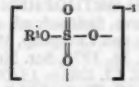


wherein R is H or an organic radical having from 1 to 20 carbon atoms, and

(2) the negative ion is an ion corresponding to the structure



or



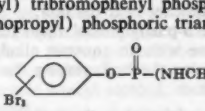
wherein R^1 is a monovalent aliphatic radical having 8 to 20 carbon atoms, and

(C) based on the weight of (A), (B) and (C), from 50–90 weight percent of a flame retarder which can be

(1) an aliphatic, alicyclic or aromatic compound of at least 6 carbons and containing from about 40–85 weight percent halogen, or

(2) an aliphatic, alicyclic or aromatic phosphorus compound of at least 6 carbon atoms and containing from about 40–85 weight percent halogen,

wherein the pH of the emulsion is in the range of 1–7, the viscosity of the emulsion is in the range of 2,000–50,000 centipoise, and the emulsion is stable for at least 100 days. The flame retarder can be tris(2,3-dibromopropyl)phosphate, bis(2 - bromoethyl) 2,5 - dibromophenyl phosphate, bis(bromochloropropyl) bromochloropropyl phosphonate, tris(dibromophenyl) phosphate, di(2,3-dibromopropyl) tribromophenyl phosphate, N,N',N'' tris-(2,3-dibromopropyl) phosphoric triamide or

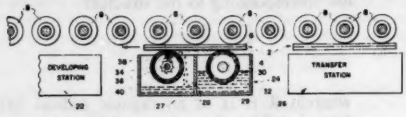


According to the process, the fiber is heated in a temperature range of about 175–220° C. for a sufficient time to cause a portion of the flame retarder to diffuse into the fiber structure. The fiber can be poly(ethylene terephthalate) or poly(1,4-cyclohexylenedimethylene terephthalate).

T896,011
CLEANING METHOD AND APPARATUS FOR REMOVING DEVELOPER FROM PHOTOSENSITIVE ELEMENTS
William C. York, Rochester, and Ivan B. Ville, Spencerport, N.Y. (both % Kodak Park, 1669 Lake Ave., Rochester, N.Y. 14615)
Filed Dec. 14, 1970, Ser. No. 97,757
Int. Cl. G03g *13/10, 15/10*
U.S. Cl. 117—37 LE
2 Sheets Drawing. 15 Pages Specification

A roller of soft absorbent, open celled, plastic material such as polyurethane is provided to remove the residual

developer image from a liquid developed photoconductive surface after image transfer. In one embodiment such roller is free to rotate as the photoconductive member passes thereover in a first direction towards the transfer station, but is prevented from rotation during passage of the element thereover in the reverse direction after transfer. Another embodiment utilizes a single such roller both to apply developer during movement towards the transfer station and to remove residual developer during reverse movement. Other embodiments utilize various arrangements of such rollers to develop and clean the photoconductive element in conjunction with a supply of carrier solution such as Isopar G.



T896,012
PROCESS OF MODIFYING POLYCARBONAMIDE FIBERS WITH ORTHOPHENYLPHENOL
Jose J. Rufino, Geneva, Switzerland, assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
Filed Dec. 16, 1970, Ser. No. 98,876
Int. Cl. D06m *13/00*
U.S. Cl. 8—130.1
No Drawing. 14 Pages Specification

A process for finishing a fabric containing highly twisted continuous filament polycarbonamide yarns wherein at least 50 mol percent of the repeating units are of the formula:

with at least 70% by weight of the diamino constituent of the repeating units being a trans-trans stereoisomeric configuration, comprising:

(A) stabilizing the fabric by heating it in open width in a medium selected from the group consisting of steam, air or water to induce from about 5 to 20% shrinkage in both warp and filling based on greige fabric dimensions;
(B) exposing the fabric to an acidic aqueous bath containing o-phenylphenol near the boil;
(C) removing the o-phenylphenol from the fabric by treating the same with an aqueous alkaline bath at a temperature near the boil, rinsing the fabric and drying the same,

the amount of o-phenylphenol in the bath being between ½ to ¾ of the total amount of o-phenylphenol indicated by the following equation:

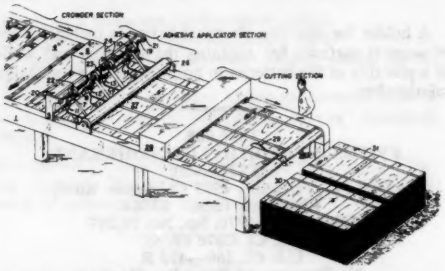
$$Y=10.1X-250$$

wherein Y is the bath-to-fabric weight ratio and X is the percent by weight of the amount of o-phenylphenol in the bath based on the weight of the fabric.

T896,013
COPOLYMERS OF METHYL METHACRYLATE
Eugene P. Reilly, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
Filed Dec. 18, 1970, Ser. No. 99,514
Int. Cl. C08f *15/18*
U.S. Cl. 260—86.1 R
No Drawing. 9 Pages Specification

Copolymers of methyl methacrylate and 2-phenylallyl alcohol are provided wherein the copolymers are derived from between about 99% and about 99.9% by weight of methyl methacrylate and between about 0.1% and about 1% by weight of 2-phenylallyl alcohol. The copolymers have an inherent viscosity of at least 0.44 and may be molded into shaped structures such as lenses.

T896,014
METHOD OF MAKING PLYWOOD CORES
James Edward Huffaker, 1117 Radcliffe 37664, and Brian Douglas Dillon, 2120 Gary St. 37660, both of Kingsport, Tenn.
Filed Jan. 11, 1971, Ser. No. 105,397
Int. Cl. B32b *5/12*
U.S. Cl. 161—60
2 Sheets Drawing. 19 Pages Specification



Method of making plywood veneer cores or sheets by continuously bringing a succession of thin random with wood veneer sections of substantially the same length into edge-to-edge contact, extruding a plurality of continuous beads of a hot melt adhesive onto the upper surface of each of the abutting sections and simultaneously pressing a strong, porous paper tape onto each of the adhesive beads in such a manner that the adhesive is caused to adhere to the undersurface of each tape, whereby strong adhesive bonds are formed between each of the tapes and the underlying surfaces of each of the sections. Alternatively, the tapes may be precoated with the adhesive and continuously applied to the sections with the adhesive side down and the adhesive melted and reactivated in situ by pressing the tape into contact with the sections by means of a heated roll. In either case the resulting product is a multi-section thin veneer core sheet which unexpectedly has sufficient strength and other desirable properties to enable it to be cut into 4 x 8 foot sheets or plys for use in standard plywood laminating operations.

T896,015
PREVENTION OF FIBER SHEDDING FROM NAPPED POLYESTER BLANKETS
Howard M. Lewis, 14525 S. Pines Cove, Dallas, Tex. 75234
Filed Jan. 11, 1971, Ser. No. 105,633
Int. Cl. B32b *27/08, 27/36*
U.S. Cl. 117—138.8 F
No Drawing. 10 Pages Specification

Fiber shedding of a napped polyester blanket is prevented by treating the napped fabric with an aqueous dispersion or emulsion of a resinous composition containing a plurality of self cross-linking acrylic polymers such as methylacrylate and ethylacrylate. Upon evaporation of the aqueous medium and curing by application of heat minute amounts of resinous copolymer formed in the curing stage find their way between the polyester fibers at points of contact and serve to spot weld these fibers at the contact points. The resulting napped blanket product is immune or highly resistant to fiber shedding in normal use or laundering and capable of retaining its original inherent loft, fluffiness and resiliency under such conditions.

T896,016
FOOD PACKAGE
Roland Gordon Harris, Chadds Ford, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
Continuation of abandoned application Ser. No. 838,485, July 2, 1969. This application Jan. 14, 1971, Ser. No. 106,572
Int. Cl. B65b *9/04*
U.S. Cl. 99—171 LP
1 Sheet Drawing. 10 Pages Specification

A sealed package useful in packaging, storing and vending foodstuffs consisting essentially of

(a) a tray having a bottom panel with side walls and a continuous outwardly extending flange having a width of at least ¼-inch connected to the upper edge of the side wall wherein the tray is prepared from a foam composite of
  (1) a core of oriented closed cell foam having an elongation of less than about 50% consisting essentially of styrene polymer having a tensile modulus greater than 150,000 p.s.i., and
  (2) a thermoplastic film preferably polyvinyl chloride or unoriented butadiene-modified polystyrene bonded to both sides of the core wherein the thermoplastic film has a tensile modulus greater than 150,000 p.s.i., an elongation percentage greater than 5% and is thermoformable within a temperature range of about 50° to 230° C.;
(b) a foodstuff contained in the tray; and
(c) a polymeric film having a thickness of about 1 to 10 mils prepared from polymers such as polyesters, polyolefins, regenerated cellulose, and elastomeric polymeric films attached to the outwardly extending flange of the tray with a heat-sealed adhesive, preferably an ethylene/vinyl acetate or an ethylene/vinyl acetate-wax blend adhesive having a bond strength of about 150 to 200 grams wherein the polymeric film cover has a tab portion extending beyond at least a portion of the perimeter of the flange with the remainder of the cover substantially coextensive with the remainder of the perimeter of the flange.

The package provides good hermetic protection for its food contents thereby significantly reducing the possibilities of spoilage and dehydration. The tab portion of the polymeric film cover over the tray provides easy opening of the package by pulling on the tab and the tray exhibits improved cut-through and puncture resistance, making it useful as an eating utensil.

T896,017
THERMOFORMING LAMINAR FOAM STRUCTURES
Leon Edward Wolinski, Buffalo, N.Y., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
Continuation of abandoned application Ser. No. 861,478, Sept. 26, 1969. This application Jan. 28, 1971, Ser. No. 110,769
Int. Cl. B29d *27/00*
U.S. Cl. 264—321
No Drawing. 8 Pages Specification

Process for thermoforming film/foam/film laminar structures by heating the laminar structure, forming it with at least one mold, heating the resulting formed structure to at least the second order transition temperature of the foam and less than the temperature at which the foam undergoes cellular collapse, and restraining the expansion of the laminar structure while maintaining the outer walls thereof at a temperature at least 10 centigrade degrees below the second order transition temperature of the foam.

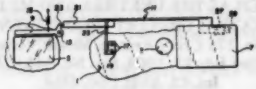
T896,018
SCUFF-RESISTANT URETHANE COATED FABRICS
Bernard Taub, Williamsville, N.Y., assignor to Allied Chemical Corporation, New York, N.Y.
Filed Feb. 1, 1971, Ser. No. 111,654
Int. Cl. B32b *27/40*
U.S. Cl. 117—76 T
No Drawing. 16 Pages Specification

Novel urethane coated fabrics of enhanced resistance to scuffing and abrasion are prepared by applying to a urethane-coated fabric a top coating consisting of a flexible heat-cured silicone polymer. The sequence of bonding the coating to the fabric is not critical. An adhesive may be applied directly to the fabric and the urethane coating may be subsequently applied thereto and cured by heating with preliminary use of release paper for the coating. Or, the urethane-coating composition may be applied directly to the fabric without prior use of adhesive or release paper. Heat-curable silicone resin polymers are known articles of commerce and are used in the form of aqueous emulsions or solutions. They typically include solutions of organosilioxanes, organosilanes and siloxane condensation catalysts. Suitable urethane coating compositions are known in the art and are preferably organic solvent solutions of fully reacted polyurethane urea resins. The coating compositions may be pigmented with a variety of inorganic or organic pigments such as titanium dioxide, phthalocyanine green, phthalocyanine blue, carbon black, bone black, chrome yellow, cadmium red and toluidine red. Fabrics suitable for coating include linen, nylon, cotton, rayon, silk, wool, polyester, polyacrylonitrile, modacrylic, or mixtures thereof. The novel urethane coated fabrics are particularly useful for automotive and furniture upholstery.

T896,019
LITHOGRAPHIC REPRODUCTIONS
Ralph Donald Zaffrann and Gale Francis Nadeau, Jr., both of 1669 Lake Ave., Rochester, N.Y. 14650
Filed Feb. 5, 1971, Ser. No. 113,106
Int. Cl. G03f *7/02*
U.S. Cl. 96—33
No Drawing. 13 Pages Specification

The press latitude of lithographic plates having gelatin printing surfaces is widened by contacting the printing surface with an acidic stop bath containing 0.5 to 10% by weight of polypropylene glycol having an average molecular weight in the range from about 200 to about 2000. The stop bath is otherwise conventional and, preferably, does not contain benzyl alcohol, diethylene glycol or triethylene glycol.

T896,020
LENS COVER AND SIGNAL DEVICE
David E. Beach, 901 Elmgrove Road, Rochester, N.Y. 14650
Filed Feb. 9, 1971, Ser. No. 113,874
Int. Cl. G03b *17/20*
U.S. Cl. 95—11 V
3 Sheets Drawing. 17 Pages Specification



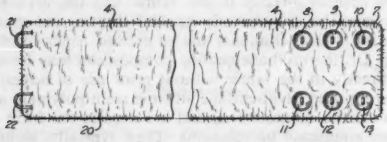
A camera having a picture taking lens and a view-finder includes a cover 7 for protecting the lens, and a signal device 9 which becomes visible in the viewfinder whenever the cover blocks the lens.

PATENTS

GRANTED MARCH 7, 1972

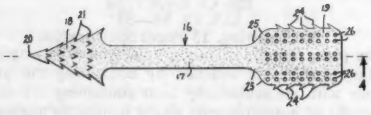
GENERAL AND MECHANICAL

3,646,614
ADJUSTABLE SHAWL COLLAR
Karl Engelmann, Roonstrasse 49-51, 54 Koblenz, Germany
Filed Jan. 4, 1971, Ser. No. 103,489
Int. Cl. A41d *23/00*
U.S. Cl. 2—91 **4 Claims**



An adjustable shawl collar consists of a length of material provided with pile or fur on both sides. One end of the collar is provided with buttons arranged in alinement in rows on both sides. The other end of the collar carries loops adapted to engage these buttons.

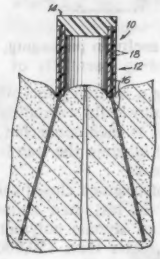
3,646,615
REINFORCING ELEMENT FOR MUSCLES
Richard A. Ness, 714 S. Mill Street, Fergus Falls, Minn.
Filed Jan. 26, 1970, Ser. No. 5,534
Int. Cl. A61f *1/00*
U.S. Cl. 3—1 **5 Claims**



A reinforcing element for connection to a muscle to add pulling power to the muscle. An elongated elastic body member has a head end provided with means for anchoring the same to a portion of a muscle, and an opposite tail end portion having transverse openings for reception of a suture whereby the tail end portion is sewn to the muscle in longitudinally spaced relation to the anchoring means on the head end portion.

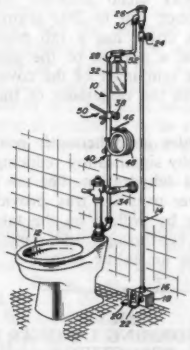
3,646,616
PROSTHESIS FOR IMPLANTING AROUND A BODY DUCT SUCH AS THE URETHRA AND METHOD OF TREATING URINARY INCONTINENCE
Jesse G. Keshin, 175 Crary Avenue, Mount Vernon, N.Y.
Filed July 23, 1969, Ser. No. 844,071
Int. Cl. A61f *1/00, 5/44*
U.S. Cl. 3—1 **5 Claims**

Prosthesis consisting of a mesh material impregnated with an antibiotic, antiseptic, antispore medication or a combination of these which surrounds a conduit leading to the skin, such as the urethra, and having an end portion thereof embedded in a water-repellent substance which protrudes from



the end of the conduit and the surface of the skin and a cap therefor.

3,646,617
BEDPAN WASHER WITH PISTOL-TYPE NOZZLE
Jerome Ingles Heald, 903 East Wardlow, Long Beach, Los Angeles County, Calif.
Filed Sept. 24, 1970, Ser. No. 75,176
Int. Cl. A47k *17/00, 11/08, 3/22*
U.S. Cl. 4—1 **11 Claims**



A water and liquid additive control system including a valved outlet and operable to automatically discharge only water therefrom when the valve controlled outlet is actuated to flow liquid therepast at a rate not exceeding a predetermined rate and to discharge water as well as metered amounts of additive liquid therefrom when the valve controlled outlet is actuated to discharge water therefrom at a rate exceeding the aforementioned predetermined rate. The valve controlled outlet of the system is further carried by the outlet end of a flexible hose including spring means biasing the hose into a coiled state and the biasing action of the

spring means on the hose as well as the valved outlet carried thereby is sufficient to at least partially coil the hose and

therefore shorten its effective length when the hose and the valved outlet are allowed to hang free.

3,646,618

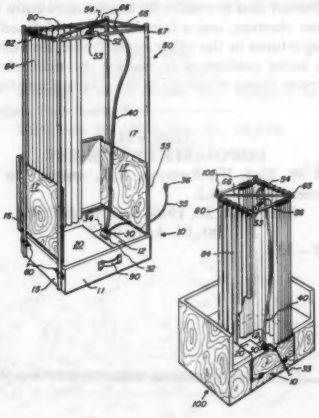
RECIRCULATING PORTABLE SHOWER FOR CAMPERS, TRAILERS OR AUTOMOBILES

Glenn J. Johnson, Route 1, Box 145, Powell, Wyo.

Filed Oct. 2, 1970, Ser. No. 77,564

Int. Cl. A44k *3/22*; **F24h** *1/06*

U.S. Cl. 4—147 **10 Claims**



A portable and collapsible shower for campers which includes a base structure forming a step portion and reservoir for water to be used in showering. The base structure includes a submersible pump connected through a flexible or rubber hose to a shower head which would be suspended above the reservoir to direct water therefrom back to the reservoir and onto the user. In the portable version, the shower includes a demountable frame for mounting an enclosing curtain for privacy, with the frame being modified in the case of a camper to be suspended directly from the ceiling thereof.

3,646,619

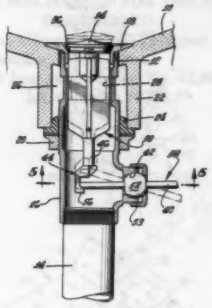
LAVATORY POPUP WASTE VALVE

Walter Rokitenetz, Granada Hills, Calif., assignor to Price-Pfister Brass Mfg. Co., Pacoima, Calif.

Filed Mar. 30, 1970, Ser. No. 23,863

Int. Cl. A47k *1/14*

U.S. Cl. 4—203 **6 Claims**



The popup plunger has an offset connector at its lower end cooperable with the end of a ball-mounted lever. In one mode of connection, the ball-mounted lever positively interlocks the plunger, preventing its being lifted out of the plunger casing. In the alternate mode of connection, an interlock is provided as in the first mode; however, unknown to the vandal or unadvised person, the interlock is released by a simple angular movement of the plunger resulting from the flexibility and resilience of the plunger connector itself.

3,646,620

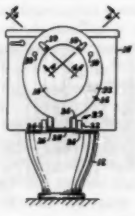
TOILET SEAT GUIDE

Joseph F. McCawley, 1101 North Drexel Avenue, Indianapolis, Ind.

Filed Mar. 16, 1970, Ser. No. 20,005

Int. Cl. A47k *13/00, 13/04*

U.S. Cl. 4—237 **10 Claims**



A position guide means for a toilet seat, preventing objectionable wobbling of the toilet seat even though the hinge may be rather loose, as is the case with many toilet seats.

3,646,621

MATTRESS STRUCTURE OR THE LIKE

Restituto R. Fragas, 7035 Templeton Street, Huntington Park, Calif.

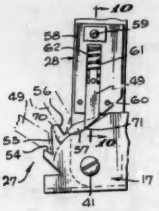
Filed Aug. 3, 1970, Ser. No. 60,570

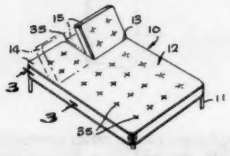
Int. Cl. A61g *7/00, 7/02*

U.S. Cl. 5—66 **21 Claims**

A bed structure or the like having a head supporting portion which is mounted to swing upwardly and downwardly to positions of different inclination relative to the main part of

the bed, and which is held in its different positions by a spring pressed latch mechanism, with the latch being releasable automatically to an inactive condition in response to arrival of the head section at a predetermined upper position, so that after such release the head section can swing downwardly without restraint by the latch mechanism and





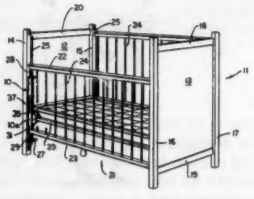
past one or more of the support positions to a predetermined lowermost setting. In a double bed structure, two of the head sections may be provided, and may be mounted for movement separately to different settings so that two different persons may have individual control of their different halves of the bed.

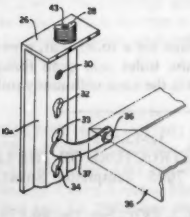
3,646,622

APPARATUS TO FACILITATE THE MOUNTING, SUPPORTING AND ASSEMBLING OF A CRIB-TYPE BED

Richard W. Van Riper, Jr., Crawfordsville, Ind., assignor to Ingress-Plastene, Inc., Crawfordsville, Ind.

Filed Oct. 15, 1969, Ser. No. 866,606
Int. Cl. A47d 7/03
U.S. Cl. 5—100 **8 Claims**





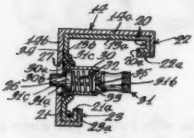
Apparatus preferably molded of synthetic resin and mounted directly to the corner post of a bed such as a crib or the like. The apparatus is a one-piece unit that combines the hardware that is necessary to mount, adjust and lock the movable sides of such a bed, as well as the longitudinal framing members of the bed itself, and the support and adjustment members of a mattress carrier used with the bed.

3,646,623

BEDFRAME ASSEMBLY

Allan E. Harris, and Wilbert E. Behnke, both of Chicago, Ill., assignors to Harris-Hub Company, Inc.

Filed May 4, 1970, Ser. No. 34,061
Int. Cl. A47c 19/00
U.S. Cl. 5—181 **7 Claims**



A bedframe assembly including an improved cross frame member comprising a first cross frame element slidably engaged within a second cross frame element. The second cross frame element includes a flange configuration defined by reentrant flange portions that confine the first cross frame element for slidable movement within the second cross frame element. Releasable locking means is positioned for securing the cross frame elements at one of a plurality of selectable positions relative to one another. The locking means includes a male element that is resiliently biased outwardly from one cross frame element, and a female element defined by a plurality of apertures in the other cross frame element with the apertures being positioned to receive the male element and hold the cross frame elements in the selected position.

3,646,624

DISPOSABLE DRAWSHEET

Frederick W. Zipf, III, Rumson, N.J., assignor to Blessings, Inc., Bound Brook, N.J.

Filed Sept. 24, 1969, Ser. No. 860,564
Int. Cl. A47g 9/02
U.S. Cl. 5—334 **7 Claims**

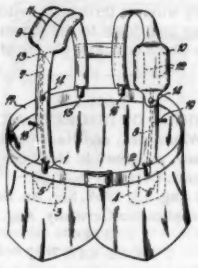
A drawsheet, suitable for hospital use, is made with a plastic film to which is laminated a highly absorbent nonwoven fabric over only the portion of the sheet that is on top of the mattress when in use. By using low-cost plastic and fabric, and by making the article by a continuous and low-cost method of manufacture, the drawsheet of this invention is suitable for use as a disposable item. Embossed polyethylene film is used and is bonded to a nonwoven cellulose fabric by adhesive applied to the plastic web with the latter folded into a flattened tube so that the adhesive contacts with only one-half of the width of the tube.

3,646,625

INFLATABLE SUSPENDERS

Walter Geier, Nurnberg, Germany, assignor to Ing. Adam Geier KG, Nurnberg, Germany

Filed Aug. 14, 1970, Ser. No. 63,803
Claims priority, application Germany, Oct. 11, 1969, G 69 39 642.5
Int. Cl. B63c 9/16
U.S. Cl. 9—335 6 Claims



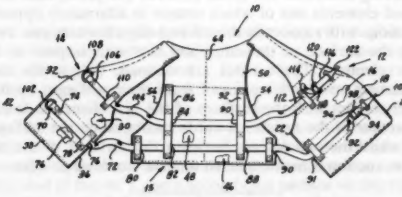
Each suspender strap of a pair of suspenders is provided with a flat relatively thin inflatable air chamber on the front terminal end depending inside and concealed by the garment to which they are connected, and a similar air chamber at the shoulder portion of the strap connected in communication with the first-mentioned chamber by an inflating hose extending between the chambers. The shoulder portion air chambers can be folded down and snapped in a deflated nonuse position which crimps the inflating hose and prevents inflation of the shoulder air chambers, and enables inflation of only the first-mentioned air chambers, until the shoulder portion air chambers are moved to the unfolded position.

3,646,626

SAILING JACKET

Leonard P. Frieder, Clarks Green, Pa., assignor to Gentex Corporation, New York, N.Y.

Filed Feb. 26, 1970, Ser. No. 14,450
Int. Cl. B63c 9/10
U.S. Cl. 9—342 12 Claims



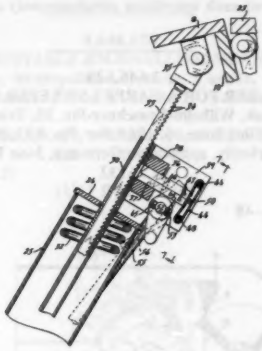
A buoyant jacket especially adapted for use by persons such as sailboat crewmen engaged in strenuous physical activity in which each of two integral differentially buoyant right and left bodies has a thin waist portion leading up to a chest portion having a vertical slit in its outer skin and a thicker shoulder portion having transverse slits in its outer skin with a hollowed inner surface area in each body below the shoulder and in which the jacket back comprises right and left buoyant bodies each of which tapers in thickness from a shoulder area toward the waist and each of which has an outer transverse groove in the region of a shoulder blade of the wearer. A fabric covering, the inner portion of which is a fishnet fabric, houses all of the bodies, joins the back bodies along the spine of the wearer and joins the back bodies respectively to the front bodies at the shoulders. Straps, one of which is vertically adjustable, extend entirely around the outside front and back bodies securely to hold the jacket on the wearer's body.

3,646,627

HOLDDOWN MECHANISM FOR THE RAMP OF A DOCKBOARD

Roderick B. Potter, Milwaukee, Wis., assignor to Kelley Company, Inc., Milwaukee, Wis.

Filed June 1, 1970, Ser. No. 42,006
Int. Cl. B65g 11/00
U.S. Cl. 14—71 16 Claims



A holddown mechanism for the ramp of a dockboard. The rear edge of the ramp is hinged to the dock and a counterbalancing member is connected to the ramp and serves to counterbalance the weight of the ramp and pivot the ramp upwardly to an inclined position. The holddown mechanism, which is manually releasable, serves to restrain the counterbalancing member from raising the ramp and includes a tubular housing pivotally connected to the dock. A spring is mounted in the housing and the force of the spring acts against the end of a concentrically mounted tube and urges the tube to a retracted or telescoped position with respect to the spring and housing. A ratchet bar is mounted for sliding movement within the tube and the outer end of the ratchet bar is connected to the ramp. To prevent relative movement between the ratchet bar and the tube, a double-pawl mechanism is associated with the tube and is engageable with the teeth of the ratchet bar. The pawls are manually released by a pivotable operating handle which operates through a lost motion connection to move the pawls out of engagement with the ratchet bar teeth and enable the force of the counterbalancing member to elevate the ramp.

3,646,628

COMBINATION TOOTHBRUSH AND PICK

George C. Halford, Mentor, Ohio, assignor to Halbrand, Inc., Willoughby, Ohio

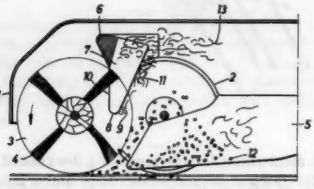
Filed Jan. 21, 1970, Ser. No. 4,568
Int. Cl. A47k 7/02; A61c 15/00
U.S. Cl. 15—118 3 Claims

The disclosure herein is of a sanitized, disposable, tooth cleaning article which includes a nonsplintering handle, having a pick portion formed at one end, which portion is normally confined within a foamed plastic scrub member, designed to scrub and clean the teeth as a toothbrush, the handle being adhered to the member in such manner as to facilitate projection of the pick portion therefrom when the member is manipulated to cause the pick to enter the in-

terstices between teeth for particle removal whilst the scrub member conforms to and moves over the surfaces of the

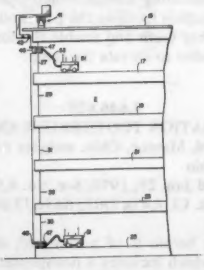
teeth adjacent such interstices simultaneously cleaning those surfaces.

3,646,629
CLEARER FOR A CARPET SWEEPER BRUSH
Gunter Bienek, Wilhelm-Leuschner-Str. 35, Trier, Germany
Filed June 16, 1969, Ser. No. 833,297
Claims priority, application Germany, June 15, 1968, B 76132
Int. Cl. A47l *11/32*
U.S. Cl. 15—48 **1 Claim**



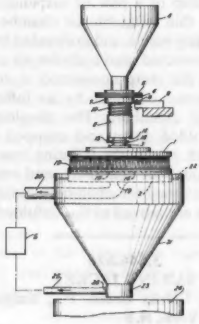
The invention provides, for the unidirectionally rotatable brush of a carpet sweeper, a clearer comb whose teeth are spaced-apart parallel triangular plates having tips that project into the bristles of the brush.

3,646,630
REMOTE CONTROL WINDOW CLEANING DEVICE
Carl D. Russell, Tulsa, Okla., assignor to Crafton D. James and Mary Lea James, part interest to each
Filed Apr. 10, 1969, Ser. No. 815,087
Int. Cl. A47l *1/03*, *7/02*, *11/38*
U.S. Cl. 15—302 **21 Claims**



This invention relates to remote control cleaning apparatus, primarily for use in cleaning both the exterior and interior sides of windows of tall buildings. Hoisting apparatus is adapted to move along a track on the roof of the building and to raise or lower a cleaning unit to a selected window. Control means which may comprise a second or master cleaning unit is provided for manual operation inside the building and electromagnetically couples to the exterior unit. Manual movement of the interior unit causes the exterior unit to follow it, the exterior unit being rendered substantially weightless through suspension by springs. Controls of the positioning, application of the cleaner, and removal thereof are provided at the interior unit and are effective at the exterior unit by electromagnetic coupling through the window and/or by wireless through a switching station at the hoisting apparatus and down to the suspended unit over the suspending wires which comprise electrical leads.

3,646,631
POLISHING OF DISCRETE ARTICLES
Helmut Wurst, Winnenden, and Hans Matthis, Kleinheppach, both of Germany, assignors to Hoefliger & Karg, Waiblingen near Stuttgart, Germany
Filed Aug. 13, 1969, Ser. No. 849,633
Claims priority, application Germany, Aug. 22, 1968, P 17 82 374.4
Int. Cl. A47l *7/02*
U.S. Cl. 15—308 **9 Claims**

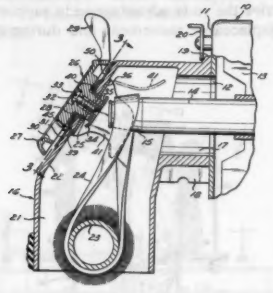


Powder-filled capsules or other articles, to whose surface excess powder tends to adhere, are cleaned and polished by advancing them into the space between two juxtaposed disk-shaped elements one of which rotates in alternately opposite directions with respect to the other, moves towards and away from the surface of the other and tilts with respect to the other element. The articles are cleaned, that is the contaminating powder is removed from their surfaces, by frictional contact with the surfaces of the two elements. During movement of the articles towards and between the surfaces, and while the articles are between the surfaces of the elements, suction is maintained to remove loosened powder.

3,646,632
INDICATING MEANS FOR A BELT LIFTER
Charles H. MacFarland, Rocky River, Ohio, assignor to The Scott & Fetzer Company
Filed Oct. 30, 1970, Ser. No. 85,478
Int. Cl. A47l *5/00*
U.S. Cl. 15—339 **2 Claims**

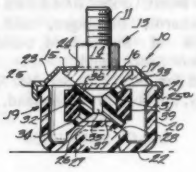
A device for removing a belt from the fan shaft of a vacuum cleaner motor and for replacing the belt on the shaft so that a nozzle casing may be detachable and replaceable with respect to the motor housing. The device includes a member which is pivotally mounted on the outer face of the nozzle casing and operates an arm within the nozzle casing. The arm, upon rotation of the member in a first direction,

removes the belt from the shaft and, upon rotation of the member in a second direction, replaces the belt on the shaft. The member has a flange which extends over a portion of the outer face of the nozzle casing. An aperture is provided in



the flange which provides an opening to expose a first area of an underlying portion of the nozzle casing when the arm and the member are in a first position and to expose a second area of the underlying portion when the arm and its member are in a second position. Indicia means are provided at the first and second areas to indicate the condition of the belt when the arm is at its first and second conditions.

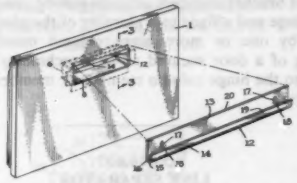
3,646,633
ADJUSTABLE SWIVEL GLIDE
James R. Meinhardt, Evanston, Ill., assignor to Keystone Consolidated Industries, Inc., Peoria, Ill.
Filed June 10, 1970, Ser. No. 45,075
Int. Cl. A47b *91/00*
U.S. Cl. 16—42 **9 Claims**



An automatic height and angle adjusting swivel glide for use on furniture, such as tables, chairs, etc., or other equipment, having an upper and a lower shell or housing part secured together, a multisectioned collet within the assembled shells resiliently held together by means of an elastic ring, and a cam with a stem for securing to the furniture or equipment. The collet is provided with opposed concave generally conical surfaces receiving a cam surface on the lower end of the stem and a second cam surface on the raised central portion of the lower floor-engaging shell. Interaction between the cam surfaces and the collet allows the glide to rise, lower and tilt relative to the stem and compensate for irregularities of the floor surface.

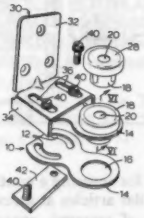
3,646,634
PULL
Robert M. Fusselman, Youngstown, Ohio, assignor to The General Fireproofing Company, Youngstown, Ohio
Filed May 7, 1970, Ser. No. 35,349
Int. Cl. A47b *95/02*
U.S. Cl. 16—124 **9 Claims**

A pull for a panel front includes a panel opening having an elongated J-shaped trim element secured to its upper edge. Formation of this upper edge permits acceptance and rigid



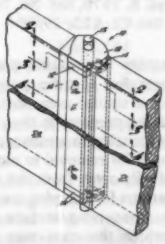
retention of the trim element by means of lock tabs integral with the trim element.

3,646,635
ADJUSTABLE JOURNALLING MEANS
Boris Stermac, Metropolitan, Ontario, Canada, assignor to Premium Forest Products Limited, Toronto, Ontario, Canada
Filed Apr. 23, 1969, Ser. No. 818,565
Int. Cl. E05d *5/06*
U.S. Cl. 16—129 **7 Claims**



A jamb bracket providing a bearing for a pivot pin projecting from the lower edge of a swinging door panel; said bracket including a pair of respectively fixed and movable plates held together in superposed relation by a pair of screws engaged in registering slots in the plates; the slots in the movable plate being concentrically arcuate and mutually confronting while those in the fixed plate are elongated, rectilinear and parallel; the bearing being mounted in an exposed and cantilevered lobe of the movable plate.

3,646,636
DOOR HINGE
Paul M. Hives, 770 N.E. 128th Street, North Miami, Fla.
Filed July 20, 1970, Ser. No. 56,310
Int. Cl. E05d *11/08*
U.S. Cl. 16—140 **10 Claims**



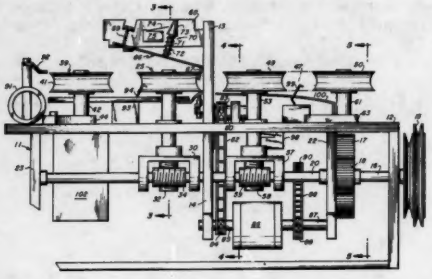
An elongated single- or double-acting hinge is described wherein extruded hinge column members and hinge pivot

ring members of identical or substantially identical cross-sectional shape are coaxially supported in registering and mutually journaled relation on a common center rod. Door attachment bracket members extending along one or both sides of the hinge and affixed to a plurality of the pivot rings interspaced by one or more hinge column members permits swinging of a door secured to an attachment bracket with respect to the hinge column member or members and/or the center rod.

3,646,637
LINK SEPARATOR

Gerald C. Berendt, 32 Dale Drive, Chatham Township, N.J., and Leslie B. Melanson, Bay Isle Drive, Point Pleasant, N.J.

Filed July 30, 1969, Ser. No. 846,042
Int. Cl. A22c *13/00*
U.S. Cl. 17—1 F **10 Claims**



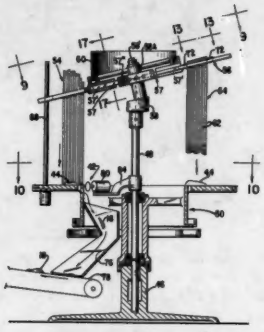
A link separator for severing a continuous link or chain of frankfurters or similar articles at successive joining segments comprising a pair of opposed, spaced-apart idler or drag wheels followed by a pair of opposed, spaced-apart, floating, powered feed wheels, the said wheels defining a generally axial path through which a chain of unsevered frankfurters feeds, a mechanical finger on the emergent side of the feed wheels engageable with the frankfurters passing therethrough, the finger deflecting as joining segments pass, a rotary knife positioned to sever the joining segments proximal to the finger, the finger being operatively connected to means controlling the rotary knife in timed relationship to the passage of joining segments, and a pair of spaced-apart, floating, power driven continuous belts on the emergent side of the knife to discharge the severed frankfurters from the apparatus.

3,646,638
METHOD AND APPARATUS FOR CLEANING CLAMS

Harold Forest Snow, Scarboro, Maine, assignor to Borden Inc., New York, N.Y.

Filed Sept. 8, 1970, Ser. No. 70,433
Int. Cl. A22c *29/00*
U.S. Cl. 17—53 **21 Claims**

A method of removing undesirable parts of clam or extracting selected parts for specific purposes such as for removing the liver, or a similar area, includes applying substantially uniform biasing pressure to the clam gradually over selected areas and proceeding in a manner and in a direction to force the part chosen for removal to move in the force applying direction gradually away from the remaining portions of the clam. An apparatus for carrying out the method of the invention comprises a receiving surface or table having a guide outline over which the clam may be positioned and which is associated with a plurality of movable members for example, rodlike weights. The weights are suspended on an apparatus for example, a rotatable tilted disk mounted above the table and each is of a length selected to bring the associated weight into engagement with a selected area of the clam placed on the table in a succession, in respect to all of the other weights, which will cause the gradual applying of the weights in a direction to cause the disassociation of a certain part of the clam from the remainder. The tilted disk which carries the rods advantageously supports the rods for vertical displaceable movement and during the rotation of

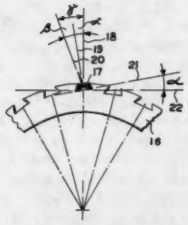


the disk with the table from a position at which the rods are supported well above the clam to the lowermost position of the tilted disk. The rods move into successive engagement with the clam and force the movement of the undesired part of the clam away from all of the rest of the clam and without damaging the clam. Additional severing means may sometimes be necessary for cutting away the connecting tissues of the removed part.

3,646,639
PORCUPINE ROLLERS

Christoph Burckhardt, Binningen, and Walter Glaser, Allschwil, both of Switzerland, assignors to Chr. Burckhardt, Basel, Switzerland

Filed Jan. 30, 1970, Ser. No. 7,082
Claims priority, application Switzerland, Jan. 31, 1969, 1557/69
Int. Cl. D01b *19/00*
U.S. Cl. 19—97 **7 Claims**



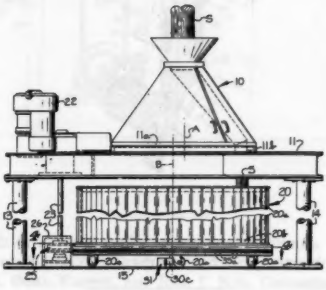
A porcupine roller wherein the roller body has needle bars releasably attached to the surface. Outwardly pointing needles are mounted on the needle bars. The roller body has on its outer surface a plurality of retaining grooves extending substantially parallel to the axis of rotation of the roller body. The cross section of the needle bars fits the cross section of the grooves so that the needle bars may be inserted into the grooves and held securely against displacement in the direction of rotation of the roller body. Means are provided for adjusting the position of the needle bars in the axial direction of the roller body.

3,646,640

TEXTILE COILER WITH COOPERATING DRIVE MEANS AND SLIVER CAN LOCATING MEANS

Herman S. Johns, Johnsonville, S.C., assignor to Wellman Industries, Inc., Johnsonville, S.C.

Filed July 6, 1970, Ser. No. 52,408
Int. Cl. B65h *54/80*
U.S. Cl. 19—159 R 13 Claims



The textile coiler and sliver can disclosed herein are provided with mating means for locating the sliver can in a predetermined position beneath the coiler head, and drive means cooperating with the mating means to maintain the mating relationship thereof while rotating the sliver can.

3,646,641

CLAMPING CONNECTION FOR CURTAINS AND THE LIKE

Lucas Wilhelmus Roben, Uithoorn, Netherlands, assignor to Elka Trust Reg., Vaduz, Liechtenstein

Filed May 14, 1970, Ser. No. 37,115
Claims priority, application Switzerland, May 16, 1969, 7250/69; Sept. 11, 1969, 13719/69
Int. Cl. A44b *21/00*
U.S. Cl. 24—73 CH 10 Claims

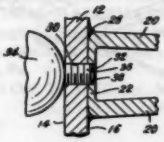
For adjusting the length of a finished curtain or the like to the height of a window, door etc. of less height than the length of the curtain a clamping connection is provided for holding a transverse fold of required width made in the upper portion of the curtain and adjusting the curtain to the desired height. The clamping connection comprises a number of clamping devices attached in transversely spaced relation along the upper marginal portion of the curtain, the clamping devices having coacting clamping members adapted to engage and lock therebetween the fold of the curtain to hold the curtain in the required position.

3,646,642

ARTICLE WITH REMOVABLE ORNAMENT THAT ALSO SERVES AS A FASTENER

Eddie Sitt, 20 West 37th Street, Brooklyn, N.Y.

Filed Apr. 27, 1970, Ser. No. 31,908
Int. Cl. A44b *1/18*
U.S. Cl. 24—97 2 Claims



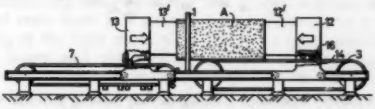
An article of jewelry comprising a base member adapted to removably receive an ornamental member whereby different ornamental members may be selectively utilized with the same jewelry article, the ornamental member having a threaded stud and the base member having a threaded aperture for threadedly receiving said stud.

3,646,643

APPARATUS FOR CUTTING SEMIPLASTIC BODIES OF CELLULAR LIGHTWEIGHT CONCRETE

Stig Olof Godin, Enskede, and Karl Robert Larsson, Solna, both of Sweden, assignors to International Siporex Aktiebolaget, Stockholm, Sweden

Filed Oct. 9, 1970, Ser. No. 79,390
Claims priority, application Sweden, Oct. 24, 1969, 14569/69
Int. Cl. B28b *11/14*
U.S. Cl. 83—112 4 Claims



In an apparatus for cutting semiplastic bodies of unhardened cellular lightweight concrete, each body is passed through a cutting frame while being transferred from a first to a second conveyor under the actuation of a positively driven pusher movable along the first conveyor, which is a free-running belt conveyor, and while being pressed against the pusher by a counterholder movable along the second conveyor, which is an endless, free-running one having a body-receiving surface composed of spaced transverse bars of a sufficient height to permit the free prongs of a fork lifter forming part of the apparatus to enter between them for lifting away the body when cutting thereof is accomplished.

3,646,644

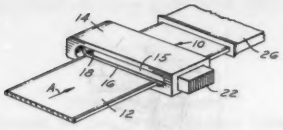
RELEASABLE STRAP ENCIRCLING MEMBER

Wilson J. Watts, Inkster, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed June 8, 1970, Ser. No. 44,372
Int. Cl. A44b *11/16, 11/06*
U.S. Cl. 24—114.5 1 Claim

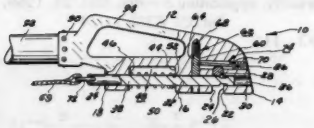
This device disables an automatic strap retraction apparatus from retracting a strap from an extended position to an unextended position. This device may be utilized with an automatically retracted seatbelt employed in a motor vehicle. The device includes a member which encircles at least a portion of the strap. The encircling member carries an element which engages the strap in order to lock the encircling

member to the strap. A releasing device is provided which cooperates with the engaging element to unlock the element



from the strap so that the strap is movable with respect to the strap encircling member.

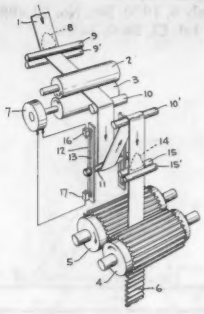
3,646,645
LOCKING DEVICE
Russell E. Bauer, Warren, Mich., assignor to KDJ-Bauer Corporation, Warren, Mich.
Filed Oct. 30, 1969, Ser. No. 872,651
Int. Cl. A44b *13/00*
U.S. Cl. 24—241 SL **6 Claims**



A remotely operable locking device having a block with a stud receiving slot which cooperates with a shiftable locking rod to form a locking engagement with the stud, the block having a plurality of bores, one of which is disposed transversely of the slot and having the locking rod slidably movable therein from a first position for retaining the stud within the slot to a second position for releasing the stud from the slot and another of the bores being disposed transversely of the first bore and having a detent mechanism slidably movable therein for engaging the locking rod when the same is moved to its second position. A third bore disposed transversely of the detent mechanism has a pivotably mounted lever which is adapted to disengage the detent mechanism from the locking rod in response to the positioning of the stud within the slot whereupon a biasing means shifts the locking rod to its first position whereby the stud is retained within the slot.

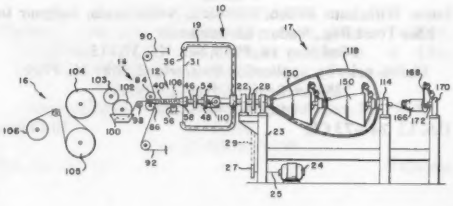
3,646,646
APPARATUS FOR SETTING STITCHES OF TUBULAR KNITTED FABRICS FOR DEKNITTING
Takao Koizumi, and Takao Kajita, both of Komatsu-shi, Japan, assignors to Teijin Limited, Osaka, Japan
Filed Feb. 24, 1969, Ser. No. 801,477
Claims priority, application Japan, Feb. 26, 1968, 43/12151
Int. Cl. D06c *23/00*; D02g *1/14, 1/20*
U.S. Cl. 26—69 R **2 Claims**

Apparatus for crimping and heat setting a deknittable knitted fabric of thermoplastic filaments under tension between hot toothed rolls, characterized by the provision of stitch loop-density regulating means at at least two positions and a device for imparting a uniform tension to the fabric running between fabric feed rolls and the hot toothed rolls,



whereby a uniform heat-setting effect is given to the fabric and the obtained yarns have an excellent crimp fastness.

3,646,647
APPARATUS FOR THE PRODUCTION OF NONWOVEN MATERIALS
Norman E. Klein, Inman, S.C., assignor to Deering Milliken Research Corporation, Spartanburg, S.C.
Filed Mar. 19, 1970, Ser. No. 21,089
Int. Cl. D02g *3/00*; D04h *3/08*
U.S. Cl. 28—1 CL **16 Claims**

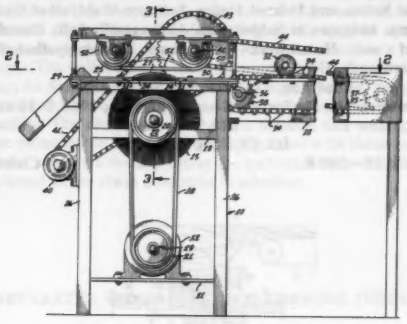


An improved apparatus for forming textile nonwoven net fabrics composed of a sheet of weft threads adhesively secured to one or more sheets of warp threads, the weft sheet being formed by continuously winding two or more threads about a pair of spaced thread supporting screws to form a plurality of reaches therebetween, and wherein the screws are rotated about their longitudinal axes such that the helically threaded surface of the screws support the loop ends of the thread reaches to laterally advance the reaches in spaced relation along the screws to form the weft sheet. The weft threads are delivered from a nonrotating creel and supported for transfer creel operation.

3,646,648
APPARATUS FOR FORMING ROLLERS FOR PRODUCING A REPETITION OF DESIGNS
Benjamin O. Kappelman, 1042 E. Campus, Tempe, Ariz., and Charles T. Myers, 174 W. Elm, Phoenix, Ariz.
Filed June 24, 1970, Ser. No. 49,402
Int. Cl. B23d *67/00, 69/00*
U.S. Cl. 29—76 **9 Claims**

An apparatus for repetitively deforming the surface of rol-

lers so that they can repetitiously reproduce predetermined



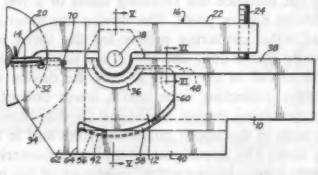
outlines.

3,646,649

GROOVING AND CUTOFF TOOL

Seibert S. Oaks, Everett, and John F. Kita, Greensburg, both of Pa., assignors to Kennametal Inc., Latrobe, Pa.

Filed Sept. 5, 1969, Ser. No. 855,704
Int. Cl. B26d *1/00*
U.S. Cl. 29—96 **14 Claims**



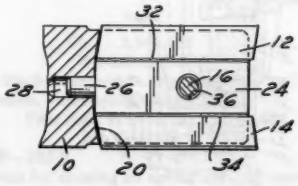
A grooving and cutoff tool having a support body with an arcuate recess formed in one side adapted for receiving a tool support having one end curved to fit in the groove and having the other end extending beyond the end of the support block. A lever pivoted on the support block is adapted for clamping an insert on the tool support while simultaneously clamping the tool support on the support block.

3,646,650

MILLING CUTTER CONSTRUCTION

Victor Milewski, Troy, Mich., assignor to The Valeron Corporation

Filed Dec. 30, 1969, Ser. No. 889,170
Int. Cl. B26d *1/12*
U.S. Cl. 29—105 **9 Claims**



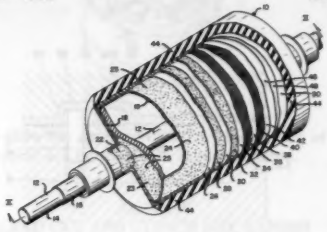
An end mill that uses a pair of flat sided diametrically opposed throwaway cutting inserts and is made by cutting a slot opening comparable to the thickness of inserts used, through the end of a shank member and then fixing a slightly thinner anvil locator centrally within the slot opening to provide insert receptive pockets on relatively opposite sides of the tool shank while still retaining a clevis space to be closed by a cross screw to clamp and hold the inserts in place.

3,646,651

ABRASION AND CORROSION RESISTANT COMPOSITE STRUCTURAL MATERIALS AND THE LIKE

Robert S. McGaughey, Indiana, and Paul Simboli, Pittsburgh, both of Pa., assignors to McCreary Tire & Rubber Company, Indiana, Pa.

Filed Oct. 29, 1965, Ser. No. 505,692
Int. Cl. B21b *31/08*
U.S. Cl. 29—130 **26 Claims**



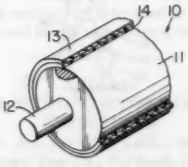
Structural materials, specifically rolls for use in steel-fabricating processes, are disclosed for use in corrosive and erosive environments. In one arrangement the roll includes a base member or substrate to which is adhered a resin coating. A reinforcing mat or cloth is adhered to and partially embedded in the resin coating, before the latter hardens. A second resin layer is coated upon and partially impregnates the reinforcing mat. A second mat is then adhered to the second resin layer in a similar manner followed by a third coating of the resin material. A greater or lesser number of resin layers and reinforcing mats can be employed as required. The specific materials employed for the resin or plastic layers and the reinforcing cloths or mats can be varied according to the specific environment in which the roll will be used. For example, in presence of hydrofluoric acid the reinforcing mat may be Dynel cloth. For resilient contact with the work a suitable elastomeric layer is placed over the last resin or plastic coating.

3,646,652

ROLLER STRUCTURE

Harry E. Heiligenthal, Butler, Pa., and Arthur E. Nichols, Jr., Kalamazoo, Mich., assignors to Dayco Corporation, Dayton, Ohio

Filed May 15, 1969, Ser. No. 824,927
Int. Cl. B41n *7/00*
U.S. Cl. 29—130 **2 Claims**



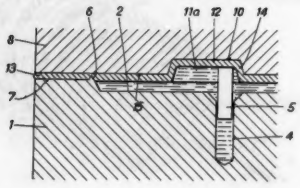
A precision roll, having a substantially rigid core, an outer plastic sleeve, and filler means made of an elastic material and provided between the core and sleeve, whereby the

plastic sleeve and filler means cooperate to enable the provision of a precision outside surface for the roll while assuring such outside surface has a resilient character.

3,646,653
METHOD AND TOOL FOR MAKING A WATCH DIAL WITH RAISED SYMBOLS

Pierre Richard, Porrentruy, Switzerland, assignor to Jap S.A., Berne, Switzerland

Filed Apr. 21, 1969, Ser. No. 817,970
Claims priority, application Switzerland, Apr. 26, 1968, 6236/68
Int. Cl. B23p *13/00*
U.S. Cl. 29—177 8 Claims

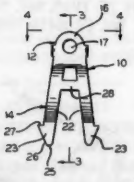


A depression in the die is filled with a liquid or pasty substance which supports the dial blank. A descending punch pushes the blank part way into the depression causing the substance of the cushion to force the blank into the punch hollows corresponding to the symbols to be raised. The die depression is surrounded by an upstanding rim that penetrates part way into the blank when the latter is pressed by the punch.

3,646,654
CLIP

Joseph J. Cervenka, 428 E. Crescent, Elmhurst, Ill., and Marvin E. Hetzel, 177 Michaux Road, Riverside, Ill.

Original application Feb. 12, 1968, Ser. No. 704,606, now Patent No. 3,558,289. Divided and this application May 26, 1970, Ser. No. 40,679
Int. Cl. B21d *53/36*
U.S. Cl. 29—190 4 Claims

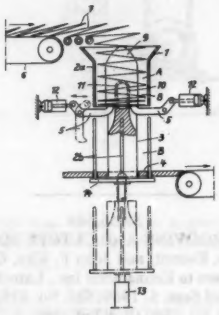


Clips to be attached to a shield can for attaching the can to a support, where the clip may be formed in continuous chain form, and each clip includes metal-piercing ears or tabs that pierce the can and are bent over to secure the clip to the can.

3,646,655
DEVICE FOR COLLECTING TURNS OF ROD OR WIRE

Hans Geipel, Oberhausen-Sterkrade; Alfred Schulz, Kaarst near Neuss, and Helmut Huber, Solingen-Wald, all of Germany, assignors to Schloemann Aktiengesellschaft, Dusseldorf and Huttenwerk Oberhausen Aktiengesellschaft, Oberhausen, Germany

Filed Aug. 11, 1970, Ser. No. 62,971
Claims priority, application Germany, Aug. 6, 1969, P 19 40 016.9
Int. Cl. B23p *19/00*
U.S. Cl. 29—200 B 4 Claims

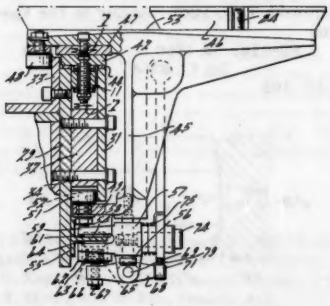


The device is for collecting runs of rod or wire to form coils after for instance the finishing stand of a rod mill or a heat treatment line or plant. The device has inner centering means and outer centering means for the turns to form a dimensionally stable coil, and there is a retractable member in the path of fall of the turns so that the device is divided into an upper collecting zone and a lower collecting zone. The inner centering means is divided so that there is inner centering both in the upper collecting zone and in the lower collecting zone. The upper part of the inner centering means is alternately supportable on the lower part of the inner centering means and upon the retractable member.

3,646,656
MACHINE HAVING OVERHANG SUPPORTS FOR PALLETS

Zoltan E. Zilahy, Nutley, and Anthony L. Dato, River Vale, both of N.J., assignors to Standard Tool & Manufacturing Co.

Filed Apr. 30, 1970, Ser. No. 33,440
Int. Cl. B23p *19/04*; B23q *5/22*
U.S. Cl. 29—200 A 15 Claims



Carriers are suspended on vertical rails providing a cantilever support for pallets which permit a machining operation

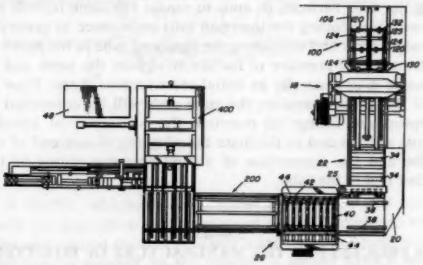
to be performed on the bottom face of a workpiece as well as the other surfaces thereof. A further novelty resides in the drive for the carriers by a single strand hollow pin conveyor chain which is bendable in a horizontal plane so that it may assume any configuration depending on the type of machining to be performed and the area which the machine is to occupy. The pallet may be movably supported on the carrier or may be fixed thereto and when movably supported, the pallet is shifted in two directions and secured in fixed position at a station. The chain has wear plates thereon and wear plates are mounted on the carrier in engagement with those on the chain which frictionally drives the carriers until one carrier is stopped as the chain continues to advance.

3,646,657

APPARATUS AND PROCESS FOR FORMING TUBULAR BODIES

Bernard J. Small, 8343 South Winchester Avenue, Chicago, Ill.

Filed Aug. 8, 1969, Ser. No. 848,512
Int. Cl. B23p *19/00;* **B21d** *53/00*
U.S. Cl. 29—200 **11 Claims**



An apparatus and process for the automatic fabrication of tubular bodies from an inner core and a blank of outer wrap material to envelop the core which is stationarily secured within the wrap and bounded by a pair of end caps. The process and the apparatus for carrying out the process includes cutting means for dimensioning the blank, flanging means for forming opposed side flanges on the blank, wrapper seamer means for wrapping with the blank a properly oriented inner core and seaming the flanged sides, second flanging means for flanging the ends of the tubular body and end cap mounting means and seamer means all of which operate in an automatic production line.

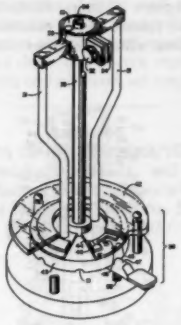
3,646,658

WINDING FIXTURE

James E. Bloch, Montevideo, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Filed Sept. 2, 1970, Ser. No. 69,084
Int. Cl. H02k *15/06*
U.S. Cl. 29—205 R **20 Claims**

Apparatus for assisting an operator in the assembly of stators, primarily for synchronous motors. The apparatus is a fixture which holds the stator and a curved mask in a series of positions which direct the operator's attention to the proper slots of the stator in which prewound coils should be placed. The correct sequence of insertion is indicated by instructions which appear in a window on the fixture. These instructions show the operator both the current step of the assembly process and the step to be next completed.

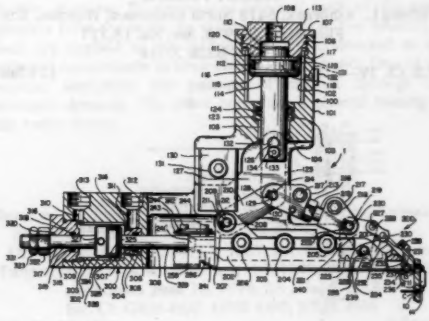


3,646,659

LEAD CUT AND CLINCH MECHANISM

Phillip A. Ragard, Binghamton, N.Y., assignor to Universal Instruments Corporation, Binghamton, N.Y.

Filed Sept. 8, 1970, Ser. No. 70,367
Int. Cl. H05k *13/04;* **H01r** *43/04*
U.S. Cl. 29—203 B **11 Claims**



An electronic component lead cutting and clinching mechanism having a linkage arrangement whereby the component leads are severed and a channel carries them out of the cutting and clinching area. The mechanism has a linkage attached to a cutting rod, the linkage being attached, in turn, to two pneumatic cylinders, which respectively power an anvil in which the cutting rod is located to bring it up to position beneath a circuit board and operate the cutting rod.

3,646,660

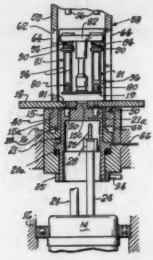
MACHINE FOR RIVETING NUTPLATES TO SUPPORT STRUCTURES

Ralph L. Sheffer, Jr., Arcadia, Calif., assignor to Omark-Winslow Aerospace Tool Co., Portland, Oreg.

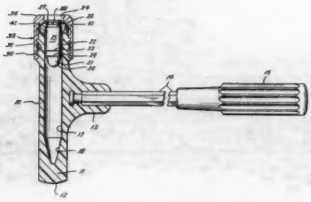
Filed Apr. 22, 1970, Ser. No. 30,772
Int. Cl. B23p *11/00*
U.S. Cl. 29—243.53 **9 Claims**

A machine for riveting nutplates to workpieces. A clamp means acts under hydraulic pressure to hold a workpiece

down against a horizontal work table. A pair of drills rise from the work table to drill holes in the workpiece to receive the rivets which will secure the nutplate thereto, and are then retracted. An elevator then rises from the workhead to elevate the workpiece a short distance, after which the retracted drills are rotated out of position and replaced by a pair of anvils against which the lower rivet heads can be upset. The nutplate with a pair of rivet slugs in the holes thereof is then fed into position over the holes in the workpiece. Upsetting rams are then lowered against the upper ends of the rivet slugs, moving the slugs first down against the anvils, and then forced on down, the elevator under this force progressively lowering the workpiece to its original level at the workhead while heads are upset on both end portions of the rivet slugs.

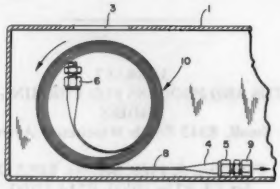


3,646,661
BULLET PULLER
Clifford L. Ashbrook, 5410 North Bralswood, Houston, Tex.
Filed Mar. 2, 1970, Ser. No. 15,777
Int. Cl. B25b *27/14*
U.S. Cl. 29—275 **12 Claims**



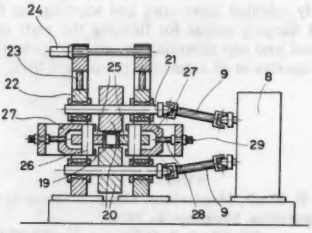
An inertial bullet puller includes a rigid tough transparent plastics material carrier tube having an opening at its upper end adapted to receive a cartridge and head means at its lower end adapted to be struck against a hard surface. The carrier is affixed transversely at the end of a handle similarly to the construction of a hammer. At the upper end of the tube is disposed annular segmented support means. A garter spring provides resilient means urging the support means segments radially inwardly into the cannelure of a cartridge. When the cartridge is inserted through the support means into the opening at the upper end of the tube, the support means expands to pass the larger diameter portions of the cartridge and then contracts into the cannelure. A screwcap at the upper end of the carrier tube having a tapered inner end provides cam means for positively moving the support segments radially inwardly and holding them in position. In use the lower end of the tube is repeatedly struck against a hard surface until the bullet is observed to pull free of the cartridge case. The lower end of the tube is closed forming a pocket to receive the bullet and case contents when the bullet is freed from the case. Tapered surfaces on the interior of the support segments provide means for moving the segments radially outwardly when the cap is backed off and the cartridge components are shaken out of the upper end of the carrier tube.

3,646,662
TUBE INSTALLATION METHOD
Kelvin D. Green, Culver City, Calif., assignor to Parker-Hannifin Corporation, Cleveland, Ohio
Filed Dec. 15, 1969, Ser. No. 884,834
Int. Cl. B23p *17/00*
U.S. Cl. 29—421 **5 Claims**



A method of installing a length of metal tube into a space which is accessible for insertion of the tube only by bending the tube to a radius which will buckle it, comprising flattening the tube between its ends to render the same flexible for bending or coiling for insertion into such space in generally straight form and subjecting the flattened tube in the space to internal fluid pressure to further straighten the same and to restore it to generally its initial cross section shape. Prior to the flattening operation the tube ends will be connected to appropriate fittings to maintain the tube ends of circular cross section and to facilitate the plugging of one end of the tube and the connection of a fluid pressure source to the other end of the tube.

3,646,663
A PROCESS FOR THE MANUFACTURE OF BOX-TYPE TUBULAR STRUCTURAL MEMBERS HAVING SELECTIVELY DIFFERENT CROSS-SECTIONAL DIMENSIONS
Javier Sario Vidal, Santa Engracia 2, Pamplona (Navarra), Spain
Filed Jan. 12, 1970, Ser. No. 2,187
Claims priority, application Spain, Jan. 7, 1970, 375,233
Int. Cl. B21d *39/02*
U.S. Cl. 29—463 **2 Claims**



A process and related system for readily and economically manufacturing structural tubes such as box girders of a variety of different sizes, even in relatively small production amounts, and which process and system comprise transporting and placing of elongated channellike members or profiles so that every consecutive two members are placed in an open

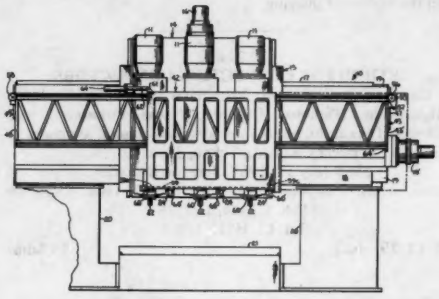
face-to-face and oppositely inclined manner, whereby the opposed members are then collectively fed into one or more welding stations where the abutting edges of the flange portions are welded together. Apparatus is used for pulling or driving the welded members into a weld finishing station and also to apparatus for substantially simultaneously effecting straightening of the welded together members which may tend to distort while being subjected to welding. The apparatus is readily adjustable to handle variable size channel members in the selective manufacturing of tubular structural members having varied cross-sectional sizes.

3,646,664

TOOL EXCHANGER FOR A PLURALITY OF SPINDLES OF A MACHINE TOOL

Wayne L. Vearil, Milford, and Lewis A. Dever, Cincinnati, both of Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed May 28, 1970, Ser. No. 41,422
Int. Cl. B23q 3/157
U.S. Cl. 29—568 14 Claims



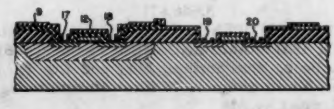
A shuttle, which has first means to support a first set of tools for disposition in a plurality of vertically disposed spindles and second means to receive a second set of tools in the spindles for support by the shuttle, is moved from a home position to a first position in which the tools in the spindles are transported to the shuttle for support by the second means. After the second set of tools has been removed from the spindles by a separate interchange arm for each spindle and received by the second means, the shuttle is moved to a second position in which the first set of tools can be transferred to the spindles by the interchange arms. The shuttle is then returned to its home position where the second set of tools is removed from the second means and a new set of tools is disposed in the first means to repeat the operation.

3,646,665

COMPLEMENTARY MIS-FET DEVICES AND METHOD OF FABRICATION

Man Jin Kim, Liverpool, N.Y., assignor to General Electric Company

Filed May 22, 1970, Ser. No. 39,659
Int. Cl. B01j 17/00; H01g 13/00
U.S. Cl. 29—571 12 Claims



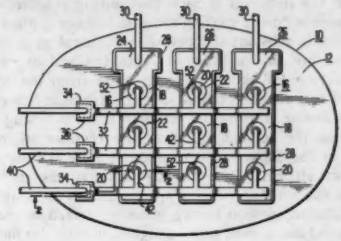
Complementary MIS-FET devices are fabricated with accurately controlled geometric and electrical properties so as to provide improvement in matching composite characteristics of device pairs, resulting in reduced power dissipation and increased speed of operation. As a related consideration, fabrication of these devices is described providing improved temperature-bias stability and radiation resistant properties. To realize the noted improvements self-aligning registration techniques are employed coupled with a simultaneous diffusion of drain and source regions. Further, improved gate dielectric compositions are employed.

3,646,666

FABRICATION OF SEMICONDUCTOR DEVICES

Edward Joseph Boleky, Cranbury, and Joseph Richard Burns, Trenton, both of N.J., assignors to RCA Corporation

Filed Jan. 2, 1970, Ser. No. 206
Int. Cl. B01j 17/00; H01l 1/16
U.S. Cl. 29—577 5 Claims



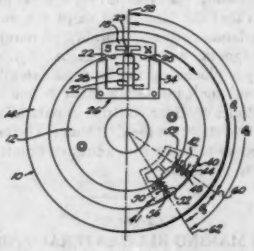
Information-storing devices, such as read-only-memories, comprise an array of semiconductor components on a substrate, each component being connected into the array by a fusible element. To disconnect selected ones of the components from the array, to store information, two sources of heat are applied to the fusible elements connected to the selected components to open-circuit the elements. One of the sources comprises the passage of current through the selected elements. The other comprises a general heating of the entire device.

3,646,667

IGNITION CIRCUIT

Douglas G. Janisch, Mequon, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.

Original application Nov. 17, 1967, Ser. No. 684,051, now Patent No. 3,524,438, dated Aug. 18, 1970. Divided and this application June 18, 1970, Ser. No. 47,218
Int. Cl. G01r 4/00; G05f 4/00; H01h 4/00
U.S. Cl. 29—593 7 Claims



A single-cylinder internal-combustion engine is provided with an ignition system of the capacitor discharge-type having a magneto for its source of electrical energy. The magneto comprises a rotor which carries a permanent magnet and is driven by the crankshaft of the engine. A main charg-

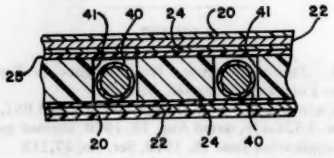
ing coil, a first trigger coil and a second trigger coil are mounted on the stator of the magneto. The position of the first coil on the stator is correlated to the engine cycle to provide an advanced ignition timing pulse and the position of the second trigger coil on the stator is correlated to the engine cycle to provide a retarded ignition timing pulse. During each revolution of the rotor a capacitor in the ignition circuit is charged from the main coil and then discharged through an ignition transformer by a silicon-controlled rectifier. Discharge of the capacitor through the rectifier is selectively timed by either the advanced ignition timing pulse of the retarded ignition timing pulse depending on the speed of the engine. The second coil is connected directly across the gate-cathode of the rectifier and the first coil is connected in series with a resistor across the second coil. The first and second coils are substantially identical within manufacturing tolerances and they are mounted on the stator with substantially identical airgaps. The value of the resistor connected in series with the first coil is such that during relatively low-cranking speeds during starting the gate voltage applied from the first coil is substantially below the critical gate voltage required to fire the rectifier. At cranking and at running speeds the retarded ignition timing pulse from the second trigger coil exceeds the critical voltage. Hence at low-cranking speeds during starting the retarded ignition timing pulse generated at the second coil fires the rectifier to initiate discharge of the capacitor at or about top dead center in a compression stroke. After the engine starts, the increased velocity of the rotor at running speeds causes the amplitude of the advanced ignition timing pulse generated in the first coil to exceed the critical gate voltage to initiate discharge of the capacitor and advance the spark.

3,646,668

METHOD OF MAKING A PLATED WIRE MEMORY USING A SHEET OF FILM ADHESIVE

Amedeo Qualich, Rochester, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed July 8, 1969, Ser. No. 839,879
Int. Cl. H01f 7/06
U.S. Cl. 29—604 **10 Claims**



An array of parallel spaced insulating lands are cast on a thin sheet of insulating material having spaced parallel conductive strips so that the lands and strips are mutually perpendicular. The lands define a plurality of parallel grooves for receiving magnetic memory wires. A film adhesive of semicured epoxy is placed on the lands to extend across the grooves. A second such insulating sheet is placed over the film adhesive with its conductive strips in parallel registration with the conductive strips on the first sheet. The combination is then processed so that the film adhesive bonds the second insulating sheet to the lands.

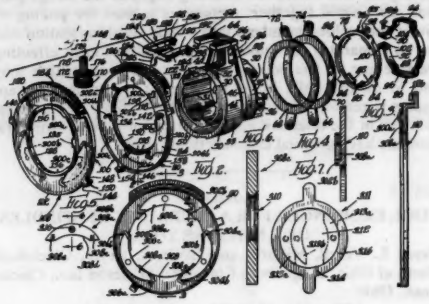
3,646,669

METHOD OF MAKING BLUE LATERAL AND PURITY MAGNETS

Lloyd A. Erickson, Niles, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Dec. 10, 1969, Ser. No. 883,938
Int. Cl. H01f 7/06
U.S. Cl. 29—607 **8 Claims**

A plurality of lateral magnets and purity magnets for use in a magnetic correction device and a method for making the same. The purity magnet comprises a ring and the lateral



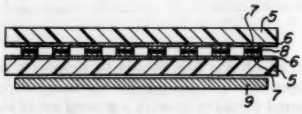
magnets are stamped from what would normally be the scrap from the center of the ring.

3,646,670

METHOD FOR CONNECTING CONDUCTORS

Yo Maeda; Satoshi Suzuki; Yoshiharu Nakamura; Yorimitu Masubuchi; Tamotsu Ueyama; Naoki Fukutomi, and Hiroshi Takahashi, all of Shimodate-shi, Japan, assignors to Hitachi Chemical Co., Ltd., Tokyo, Japan

Filed July 17, 1969, Ser. No. 842,620
Claims priority, application Japan, July 19, 1968, 43/50518; Feb. 3, 1969, 44/7315
Int. Cl. H01r 43/00
U.S. Cl. 29—627 **5 Claims**



Terminals of a large number of conductors bondedly laid on an insulating sheet are connected to the corresponding number of counterpart terminals of conductors bondedly laid on another similar insulating sheet by laying, by plating, a solder layer of readily weldable metal having a low-melting point onto the individual surfaces of the terminals on at least one of the insulating sheets, disposing said sheets one upon another so that the terminals of one of the sheets can coincide with the corresponding counterpart terminals of another sheet in a face-to-face position, and heating the disposed sheets from the outside of at least one of the sheets thereby to weld the solder layer to the counterpart terminals. An adhesive layer can be laid on the surfaces of the insulating sheets to heat-weld the insulating sheets to one another before welding the solder layer to the counterpart terminals. Conductors of one part can be thereby connected to those of the counterpart with less resistance at joints for a very short period of time without any contact of one conductor with another due to migration and bridging of molten solder.

3,646,671

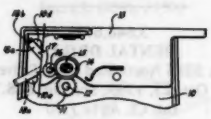
ELECTRIC CAN OPENER WITH REMOVABLE HAND LEVER AND FRAME-ENGAGING PIN ASSEMBLY

Robert J. Scott, Blue Springs, Mo., and Leo F. Aberer, Shawnee, Kans., assignors to Rival Manufacturing Company, Kansas City, Mo.

Filed Dec. 19, 1969, Ser. No. 886,576
Int. Cl. B67b 7/38
U.S. Cl. 30—4 R **8 Claims**

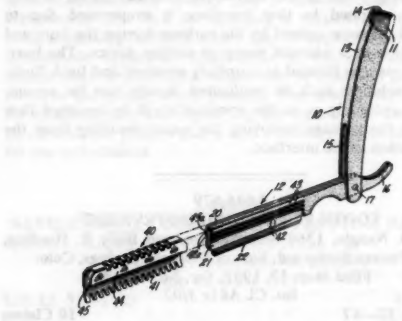
An electrically powered can opener has a cutter wheel carrying hand lever pivotally attached to its forward upright

frame by an elongate pin member, said pin member having a transverse locking bar fixedly attached to the inner end portion thereof for engaging an inner portion of the frame. The pin member is rotatably mounted within a portion of the hand lever and has a pivot arm extending therefrom. The



pivot arm is movable between a locked and a release position; the release position allowing said transverse locking bar to align with a keyed bearing opening in the upright frame so that the pin member and hand lever may be withdrawn from the upright frame.

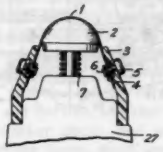
3,646,672
ADJUSTABLE FOLDING RAZOR
Paul A. Braginetz, Augusta County, Va., assignor to Philip Morris Incorporated, New York, N.Y.
Filed Apr. 20, 1970, Ser. No. 30,080
Int. Cl. B26b *21/02*
U.S. Cl. 30—32 **9 Claims**



A folding razor comprising a handle part and a shank member of plastic material in which is mounted a cutting blade, the razor having a guard member slidable over the shank member and blade, the two faces of the generally flat shank each having a series of longitudinal grooves and the guard member having a rib portion selectively slidable into any one of the grooves for positioning the guard on either side of the shank and in various laterally adjusted positions relative to the cutting edge to vary the edge exposure.

3,646,673
ELECTRIC DRY SHAVER WITH MOVABLE COMB
Goichi Yamaoka, Okayo-shi, Japan, assignor to Kabushiki Kaisha Suwa Seikosha
Filed Aug. 26, 1969, Ser. No. 853,016
Int. Cl. B26b *19/10*
U.S. Cl. 30—43.92 **6 Claims**

An electric dry shaver in which the comb is movably or slidably mounted to the head frame and pressed thereagainst by holding plates so that the resistance of the comb to movement is substantially constant. The reciprocating cutter is biased into engagement with the comb whereby the comb



and cutter can move together during shaving to assure constant engagement between the comb and cutter.

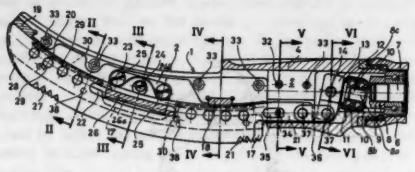
3,646,674
HOLDERS FOR SHAVING DEVICES
James Fitzpatrick, West Drayton, England, assignor to Wilkinson Sword Limited, London, England
Filed Jan. 28, 1970, Ser. No. 6,385
Claims priority, application Great Britain, Jan. 28, 1969, 4,754/69
Int. Cl. B26b *21/16, 21/54*
U.S. Cl. 30—64 **2 Claims**

A holder for a shaving unit, the shaving unit consisting of a substantially rigid member to which a razor blade is secured in a permanent manner with the rigid member having a guard surface located at a preset spacing from the cutting edge of the blade, comprising a catch which is movable between a first position at which it retains a shaving unit in the holder and a second position at which it no longer retains the shaving unit in the holder, and means for initiating movement of the shaving unit out of the holder when the catch is moved to the second position.

3,646,675
MOTOR-DRIVEN CUTTING DEVICE
Hans Georg Wezel, Maulbronn am Wurttemberg, Germany, assignor to Firma Schmid & Wezel, Maulbronn am Wurttemberg, Germany
Filed May 18, 1970, Ser. No. 38,148
Claims priority, application Germany, May 20, 1969, G 69 20 258
Int. Cl. B26b *19/02*
U.S. Cl. 30—217 **21 Claims**

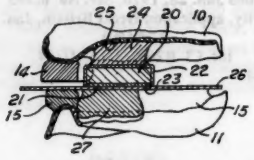
The back of the reciprocating blade of a motor-driven knife is supported for sliding movement near its ends by two wear-resistant abutments, and has a central cutout in which a

wear-resistant guide means is located in sliding engagement with a longitudinal guide edge of the cutout. By transverse



adjustment of the guide means, play-free guidance of the blade is obtained.

3,646,676
MAGNETIC DENTAL APPLIANCES AND METHODS FOR USING SAME
John Pat Mitchell, 3301 Greenville Avenue, Dallas, Tex.
Filed Feb. 24, 1970, Ser. No. 13,548
Int. Cl. A61c *13/00*
U.S. Cl. 32—2 **5 Claims**

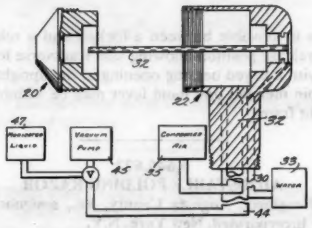


Magnetic dental appliances and materials therefor, magnetic denture teeth, magnetic transfer apparatus and method magnetic denture material; and particularly magnetic methods and apparatus for making full dentures and bridges providing an accurate functional balance of occlusion and centric relation for use in the full denture and bridge construction, including the use of magnetic holding means for transferring the upper baseplate and lower bite rim in proper locked relationship to an articulator. Also, a method of retention of the dentures and bridges in place in the mouth during use by magnetic means is provided, including magnetic core artificial teeth, magnetic denture base material, and magnetic alloy inserts for implanting under the soft tissue along and into the alveolar ridge.

3,646,677
COLLET CHUCK FOR A DENTAL INSTRUMENT
Martin Saupe, Mittelbiberach, and Gerhard Farian, Biberach/Riss, both of Germany, assignors to Kaltenbach & Voigt, Biberach/Riss, Germany
Filed Sept. 8, 1969, Ser. No. 855,898
Claims priority, application Germany, Oct. 18, 1968, P 18 03 919.5
Int. Cl. A61c *1/08*
U.S. Cl. 32—26 **5 Claims**

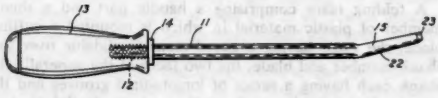
The invention relates to a collet chuck for a dental instrument and comprises two sleeves arranged concentrically within one another in play-free and force-locking relation. The outer sleeve is of an elastic material such as rubber. The inner sleeve is of a plastic composition, such as polyamide, which has less adhesion ability than the material of the outer sleeve. The outer sleeve is shorter in length than the inner sleeve whereby it may expand axially in response to radial pressure thereon.

3,646,678
DENTAL DRILL
Roy E. McAlister, 5285 North Red Rock Drive, Phoenix, Ariz.
Filed Oct. 23, 1969, Ser. No. 868,757
Int. Cl. A61c *1/10*
U.S. Cl. 32—26 **12 Claims**



A dental drill for milling tooth animal and bone material wherein the burr removing the material is cooled by evaporation taking place at the burr-tooth interface as liquid continually supplied to that interface is evaporated due to reduced pressure caused by the turbine driving the burr and connection to a vacuum pump or similar device. The burr-turbine may be formed as a unitary member and back flushing of solution such as medicated liquids can be accomplished cyclically or at the operator's will by reversed flow through the passage removing the vapor resulting from the evaporation at the interface.

3,646,679
TOOTH EXTRACTING INSTRUMENT
Gene O. Naugle, 1360 Mears Drive, and Billie R. Harding, 721 Powers Boulevard, both of Colorado Springs, Colo.
Filed Mar. 10, 1971, Ser. No. 122,901
Int. Cl. A61c *3/02*
U.S. Cl. 32—47 **10 Claims**



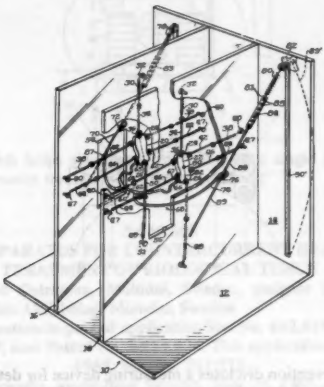
A hand-held instrument suitable for removing a wolf tooth from the upper jaw of a horse includes an elongated shank having a handle mounted on the rear end and provided with an extractor heat at the other forward end. The extractor head is preferably inclined at an angle to the axis of the shank to afford better leverage in prying and has a unique configuration terminating in a forward beveled cutting edge which permits the head to be slid between the wolf tooth and an adjacent tooth to loosen the root and pry the wolf tooth loose by applying a force to the handle outside the mouth of the animal with only two positions for the extractor head relative to the wolf tooth.

3,646,680

ORTHODONTIC FORCE MODEL

John L. Wolfney, 1 South Ardmore Avenue, Villa Park, Ill.; Ronald W. Jawor, 5425 W. Ferdinand, Chicago, Ill., and Norman L. Sanders, 8001 Edgewater Drive, North Riverside, Ill.

Filed July 30, 1970, Ser. No. 64,905
Int. Cl. G09b 19/00
U.S. Cl. 32—71 23 Claims



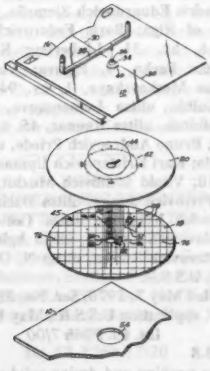
An orthodontic force model comprising a pair of simulated teeth suspended by springs and a conventionally shaped orthodontic face bow for applying a variable force to the teeth simulating the force which may be applied by extra-oral orthodontic apparatus. Application of the external forces causes tooth displacement which may be observed and compared to the normal tooth position. The model may be used for demonstrating and explaining the orthodontic process to an orthodontic patient and is also a useful experimental tool for the orthodontist.

3,646,681

NAVIGATIONAL COMPUTER AND PLOTTING DEVICE

Francis L. Koenig, 6819 Elm Street, McLean, Va.

Filed Dec. 31, 1969, Ser. No. 889,364
Int. Cl. G01c 1/02
U.S. Cl. 33—1 SD 4 Claims



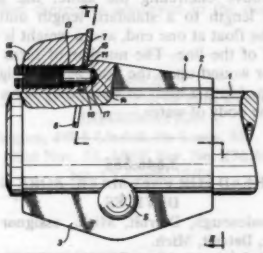
A transparent-overlay combined navigational computer and plotting sheet usable directly upon any map, chart or the like, or, when secured to a rigid support panel, forming a pocket to receive such chart for portable or open-cockpit use; removably pivoted to the underside of the cover sheet are discs providing a compass rose protractor, a grid of distance lines and a series of parallel locating lines, a novel arrangement for magnetic deviation corrections with its reading auxiliaries, a series of azimuth locators, and axial graduations for vector diagram construction, all facilitating course, distance and location estimation and plotting, with allowances for compass variation and deviation error, current vector construction, and the solving of standard coastwise navigating problems and the like, together with protection of the chart against weather abuse, and windblown loss. A pelorus arm with sighting vanes, pivot, and hairline coinciding with the compass rose protractor is also provided.

3,646,682

INTERCHANGEABLE FRONT SIGHT FOR HAND FIREARMS

Wohrstein Edwin, Altoberndorf, Germany, assignor to Feinwerkbau Westinger & Altenburger KG

Filed July 23, 1969, Ser. No. 844,097
Int. Cl. F41g 1/22, 11/00
U.S. Cl. 33—47 9 Claims



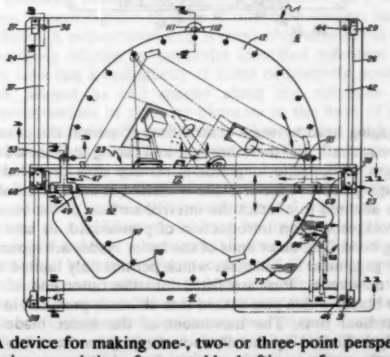
An interchangeable front sight for hand firearms including a front sight holder to be secured to the weapon barrel and a front sight blade inserted into the holder. The front sight blade having integral flexible legs which engage the weapon barrel to force the sight blade into contact with the holder and thereby hold the blade in place.

3,646,683

PERSPECTIVE DRAFTING SYSTEM

Verl N. Barzee, 708 Knickerbocker Dr., Sunnyvale, Calif.

Filed May 20, 1970, Ser. No. 39,049
Int. Cl. B43l 13/14
U.S. Cl. 33—77 11 Claims



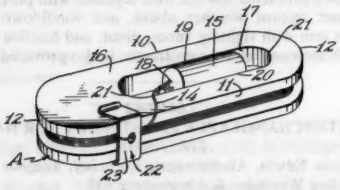
A device for making one-, two- or three-point perspective drawings consisting of a rotatable drafting surface, a parallel straightedge and the rotating surface for conjoint movement.

3,646,684

DEPTH-FINDING DEVICE

Glen E. Paulsen, Minneapolis, Minn., assignor to T.O. Plastics, St. Paul, Minn.

Filed Oct. 2, 1969, Ser. No. 863,102
Int. Cl. G01b 3/00
U.S. Cl. 33—126.5 9 Claims



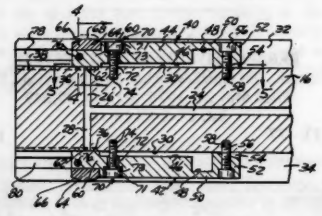
A depth finder comprises a float body having a peripheral continuous groove encircling the same, the groove corresponding in length to a standard length unit. A line is anchored to the float at one end, and a weight is attached to the other end of the line. The number of turns of line unwound from or wound upon the float as the weight is drawn from, or dropped into a body of water may serve to indicate the depth of the body of water.

3,646,685

GAGING HEAD FOR PNEUMATIC BORE GAGING DEVICES

Walter E. Goodenough, Detroit, Mich., assignor to Etronic Corporation, Detroit, Mich.

Filed July 10, 1969, Ser. No. 840,620
Int. Cl. G01b 5/00, 13/08
U.S. Cl. 33—143 9 Claims



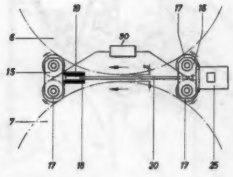
A gaging head having a central bore to permit the passage of pressurized air therethrough and being connected by passages to opposite longitudinal surface slots provided on the gaging head. A feeler blade is carried in each of the slots and is adapted to contact the internal surface of the bore in the workpiece upon introduction of pressurized air into the gaging head. The outer ends of the feeler blades are mounted in the gage head in a manner which permits only limited outward movement. Pins are fitted into the outer end of the feeler blades which pins extend into channels provided in the longitudinal slots. The movement of the feeler blade assembly is limited by the distance the pins can move in the channels.

3,646,686

MEASURING DEVICES FOR ROLLING MILLS

Heinz A. Kreiskorte, Darmstadt-Eberstadt, Germany, assignor to Moeller & Neumann G.m.b.H.

Filed Aug. 8, 1969, Ser. No. 849,303
Claims priority, application Germany, Aug. 10, 1961, P 17 52 947.4
Int. Cl. G01b 5/14
U.S. Cl. 33—182 1 Claim



The invention discloses a measuring device for determining the width of the rolling gap of a rolling mill, wherein variation of the spacing between two work rolls during rolling is detected by means of the correspondingly varying spacing of two roller holders urged into contact with the work rolls on opposite sides of the rolling gap, a stator winding being attached to the one roller holder and a displaceable core in the winding being attached to the other roller holder by means of a rod extending through the rolling gap. Electrical output signals obtained from the winding in consequence of relative displacement of the core may be used for keeping the rolling gap constant. The spacing between the roller holders may be adjustable to cover a range of rolling gap widths.

3,646,687

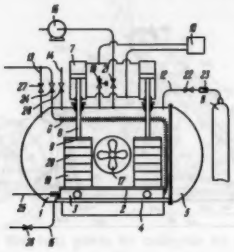
PROCESS FOR PACKING AND DRYING SOLID WOOD AND A PLANT FOR ACCOMPLISHING SAME

Gunard Valdemarovich Berzin, ulitsa Yaunsaules, 12; Arvid Yanovich Kalnin, ulitsa Sverdlova, 8, kv. 3, both of Riga; Alexandr Fedorovich Sushkov, Gogolevsky bulvar, 17, kv. 1, Moscow; Voldemar Petrovich Skrupsky, ulitsa Aptiekas, 13, kv. 1; Andris Eduardovich Ziemelis, ulisa Stopinju, 50, kv. 1, both of Riga; Boris Fedorovich Soloviev, ulitsa Kalarash, 11, kv. 31, Ljubertsy; Karl Mikhailovich Leeniex, ulitsa Parka, 4, Elgava; Vladimir Kirilovich Sovetin, ulitsa Moskovskaya, 1, kv. 94, Ljubertsy; Yan Karlovich Gulbis, ulitsa Lomonosova, 12, kv. 9; Yan Yanovich Dalbinsh, ulitsa Raunas, 45, korpus 5, kv. 221, both of Riga; Bruno Andreevich Priede, ulitsa Rainya, 116, kv. 1, Jurmala; Karl Kristapovich Upman, ulitsa Fr. Engelsa, 20, kv. 10; Vitold Iosifovich Muzhit, ulitsa Unias, 31, kv. 8; Yan Petrovich Junga, ulitsa Dzelzaves, 13, kv. 13; Ivar Arnoldovich Krogzem, ulitsa Talivalzha, 28, kv. 1; Zigurd Boleslavovich Greitan, ulitsa Aglonas, 28, kv. 100, and Karl Arturovich Rotsen, ulitsa N. Ostrovskogo, 2, kv. 2, all of Riga, U.S.S.R.

Filed May 7, 1970, Ser. No. 35,502
Claims priority, application U.S.S.R., May 12, 1969, 1331274
Int. Cl. F26b 7/00
U.S. Cl. 34—13.8 4 Claims

A process for packing and drying solid wood, wherein the wood is treated with ammonia at elevated temperatures and under pressure, and simultaneously packed, thereby produc-

ing wood which features uniform density over its entire cross section. A plant for accomplishing the process of the inven-



tion, which helps simultaneously effect in a single chamber both ammonia treatment and forced packing.

3,646,688

APPARATUS FOR COUNTERCURRENT HEAT TREATMENT OF BIOLOGICAL TISSUE

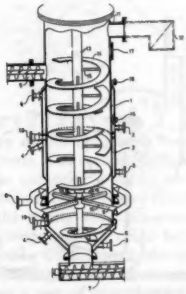
Sven Olof Osterman, Molndal, Sweden, assignor to Astra Nutrition Aktiebolag, Molndal, Sweden

Continuation-in-part of application Ser. No. 662,819, Aug. 23, 1967, now Patent No. 3,565,634. This application July 1, 1968, Ser. No. 741,511

Claims priority, application Sweden, June 30, 1967, 10215/67

Int. Cl. F26b *17/12*

U.S. Cl. 34—168 **14 Claims**



A device and a method for a continuous heat treatment of biological tissue material that may or may not be disintegrated, such material comprising, e.g., fish, wherein the material is treated with heat in countercurrent to the material flow using a vertically arranged container provided with at least one vertically arranged shaft mounted for rotation. The shaft is provided with stirrers each having a vertical and helical pitch and being adapted to work the material zone by zone in vertical and horizontal directions.

3,646,689

CONTINUALLY OPERATING FLUIDIZED BED DRYER FOR DRYING LOOSE MATERIAL

Gunther Kuchenthal, Ludwigsburg-Pflugfelden, and Wolfgang Hentzschel, Stuttgart-Sud, both of Germany, assignors to Werner & Pfleiderer, Stuttgard-Feuerbach, Germany

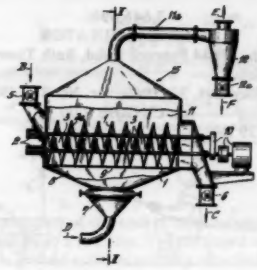
Filed Sept. 11, 1970, Ser. No. 71,547

Claims priority, application Germany, Sept. 17, 1969, P 19 46 997.7

Int. Cl. F26b *17/20*

U.S. Cl. 34—182 **8 Claims**

A continuously operating fluidized bed dryer for loose material such as granulated material comprises a housing in which the fluidized bed is generated by feeding the material into the housing and fluidizing the same by a flow of pressurized air directed upon the material in the housing. Two or more meshing conveyor screws are rotatably mounted in the housing substantially occupying the space therein within



which the fluidized bed is generated. The meshing turns or windings of the screws define a plurality of individual fluidizing chambers by which the material fed into the housing at the intake end thereof is conveyed to the discharge end of the housing.

3,646,690

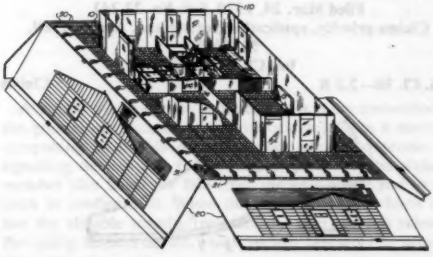
APPARATUS AND METHOD FOR CONVEYING INFORMATION

Robert L. Feagan, 4905 Lindell, St. Louis, Mo.

Filed Nov. 14, 1969, Ser. No. 876,664

Int. Cl. G09b *25/04*

U.S. Cl. 35—16 **23 Claims**



Information relevant to proposed construction is conveyed by mounting planning element representations on a base or bases in unambiguous relation to reference lines on the base or bases. A mensuration strip is removably mounted in direct identifying relation to particular identified reference lines. The base has a multiplicity of holes consistently positioned with respect to and spaced along the reference lines. Representations of planning elements in the form of model pieces, dimensionally stable and self-supporting, each has a plurality of pegs projecting from an edge, the pegs being spaced to fit into spaced ones of the holes in the base. Saddle-shaped opening designations are removably mounted on dimensionally stable self-supporting model wallpieces. A flat pattern of a building model may be used, scale related to spacing of holes in a base, suitable for penetration by model piece pegs. Indicia of reference standard details are mounted in unambiguous relation to at least one reference line on the base and in clear relation to a representation of a planning element. Construction details may be a part of a representation of a planning element. Exterior building (facing) elements, e.g., outside wall surfaces, doors, windows, roof sur-

faces, on a common scale, mounted in projective relationship, in the relation of elevation to plan, to model pieces on the base. Information conveyed by the reference lines, mensuration strip and indicia of reference standard details being assimilable by a digital computer.

3,646,691
FISHING SIMULATOR

Roy E. French, 12644 Peacock Road, Bath Township, Clinton County, Mich.

Filed Oct. 30, 1969, Ser. No. 872,495
Int. Cl. G09b *9/00*
U.S. Cl. 35—29 R **10 Claims**

A device for simulating the sport of fishing which can be used as an educational toy for children or as a novelty item for fishing enthusiasts. It comprises a fishing rod, fishing line, float, and a nonbuoyant first weight as a fish. A second weight, slidably attached to the fishing line, is releasably maintainable so that its weight does not come to bear on the buoyancy of the float and first weight when immersed in water. Upon its release, the second weight falls along the fishing line, causing the float to sink, thereby simulating the striking of a fish at the end of the fishing line.

3,646,692
SHOES

Herbert Glogg, Zurich, Switzerland, assignor to Willy Glogg AG, Zurich, Switzerland

Filed Mar. 24, 1970, Ser. No. 22,241
Claims priority, application Switzerland, Apr. 1, 1969, 5117/69
Int. Cl. A43b *9/02*
U.S. Cl. 36—2.5 R **5 Claims**

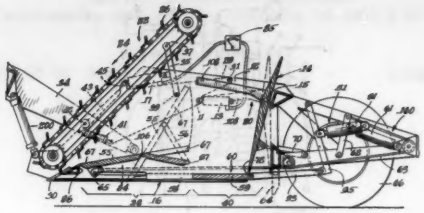
A shoe or slipper of the turnshoe-type, that is, a shoe which is manufactured by stitching together the outsole and upper inside out, and then turning the construction so formed right side out. The shoe is provided after being turned right side out with a heel, to the front side of which portions of the insole and outsole are secured. The upper incorporates a heel covering portion which, together with an end of the outsole, is retained within a cavity in the heel underside by means of a heel lift.

3,646,693
IMPROVED ELEVATOR CONTROL FOR EARTH-MOVING APPARATUS

Lovel R. Simmons, M-R-S Manufacturing Co., Flora, Miss.

Original application Nov. 22, 1967, Ser. No. 685,009, now Patent No. 3,521,388. Divided and this application Feb. 2, 1970, Ser. No. 12,489
Int. Cl. E02f *1/00*; B60p *1/38*
U.S. Cl. 37—8 **15 Claims**

Apparatus for loading and emptying earth-moving and scraping vehicles of a mobile type, the vehicle comprising a front opening container or bowl with a loading elevator structure in the forward end and an operable bottom or floor

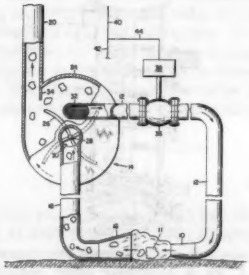


for dumping materials from the bowl. The elevator is carried by arms pivoted to the bowl such that the elevator is free for both pivotal and translatory movement relative to the arms.

3,646,694
DREDGING METHOD EMPLOYING INJECTION AND SUCTION NOZZLES

Earl J. Beck, Jr., Ventura, Calif., assignor to The United States of America as represented by the Secretary of the Navy

Filed Dec. 17, 1969, Ser. No. 885,764
Int. Cl. E02f *3/92*
U.S. Cl. 37—195 **1 Claim**



A dredging method and apparatus employing high-velocity directed injector nozzles which hydraulically dislodge and drive discrete bodies of large inertia from a position at rest on an aqueous floor into a cooperating vacuum device which collects such bodies and removes them to another area for further treatment.

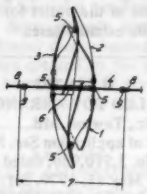
3,646,695
ARTICLE OF DECORATION

Peter-Michael Pfeiffer, Munich, Germany, assignor to REFEKA Reklame-, Fest- und Karnevals-Artikelfabrik GmbH, Munich, Germany

Filed June 4, 1970, Ser. No. 43,412
Claims priority, application Germany, June 9, 1969, G 69 22 957.8; Oct. 30, 1969, G 69 42 265.7; Jan. 2, 1970, G 70 00 029.2
Int. Cl. G09f *11/15*
U.S. Cl. 40—39 **4 Claims**

An article of decoration having two juxtapositioned elastically flexible parts which are supported on a flexible rope or wire and are interconnected at points circumferentially spaced along their peripheral edges, and a spacer member

located on the rope between the parts for spreading the two parts apart when the article is in an operative position, and

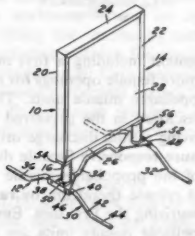


for permitting the two parts to collapse or close together when the article is in an operative position.

3,646,696
POSTER DISPLAY DEVICE

Robert Sarkisian, 8644 Woodside Park Drive, Oak Park, Mich.

Filed Sept. 11, 1967, Ser. No. 670,511
Int. Cl. G09f *7/00*
U.S. Cl. 40—125 H **5 Claims**



The poster display device includes a base upon which is mounted a poster frame. The means for mounting the poster frame onto the base comprise a spring structure interconnecting the lower portion of the poster frame to the base. In one embodiment, the spring structure comprises a pair of spaced-apart coil springs which extend between the frame and the base. In another embodiment, the spring structure is an elongated torsion spring mounted transversely of the base. The poster frame has a pair of spaced-apart brackets on the lower edge thereof which engage the torsion springs.

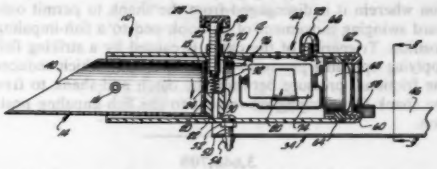
The poster frame, which normally extends vertically upwardly from the base, has a backing member mounted thereon for receiving posters or like advertising or other media. The surface area of the backing member is relatively large. The spring structure upon which the frame is mounted permits the frame and backing member to deflect downwardly upon the application of a force thereto, as for example, the wind when the structure is located out of doors. The frame may deflect in either direction without danger of tipping the base. The stronger the applied force, the more the frame will deflect downwardly thus reducing the component of any force tending to topple the display device.

3,646,697
FISH ALARM

George H. Jennings, 4821 North LaSena, Baldwin Park, Calif.

Filed July 6, 1970, Ser. No. 52,576
Int. Cl. A01k *97/12*
U.S. Cl. 43—17 **12 Claims**

A fishing accessory includes an outer tubular body pivotally mounting an inner spring biased tubular socket having an open upper end projecting through an open upper end of the body to receive the handle of the fishing rod in a manner such that a tug on the fishing line tends to rotate the socket from its normal position against the spring bias on the socket. The body contains an electrical signalling circuit for

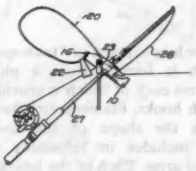


signalling this rotation of the socket from normal position to alert the fisherman of a fish bite. The disclosed inventive embodiment has a ground stake removably attached to the body for supporting the latter in a generally upright fishing position.

3,646,698
SIGNALLING DEVICE FOR A FISHING LINE

Gottfried Zachae, 23 Pratt Street, Norwich, Conn.

Filed Oct. 8, 1969, Ser. No. 864,824
Int. Cl. A01k *97/12*
U.S. Cl. 43—17 **8 Claims**

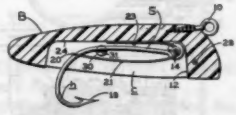


A device which can be mounted on a stake embedded in the ground or mounted in the oarlock holder on a rowboat comprising a slidable member which serves to retain the signalling device in a spring tension position. The slidable member also holds the line from the end of the rod to the hook in confinement. When the fish pulls on the hook and line the slidable member releases the line and this releases the spring tension device which springs upwardly to provide the necessary signal.

3,646,699
ARTIFICIAL FISH LURE

Jack R. Zeman, P.O. Box 10, 167 Wilton Manor Branch, Ft. Lauderdale, Fla.

Filed Feb. 27, 1970, Ser. No. 15,128
Int. Cl. A01k *83/02*
U.S. Cl. 43—35 **7 Claims**



An elongated lure body having a pivotal mounting for one end of a conventional hook shank, the shank being swingable through 90° or more between a retracted position adjacent to

the lure body and parallel therewith and an extended position in which the hook is disposed well away from the lure body. Spring means is associated with the hook to bias the hook to the extended position. A spring-biased catch, is mounted on the lure body and has a locking bolt movable from a tensioned cocked position blocking the movement path of the shank and frictionally engaging the shank to a relaxed position wherein it is disengaged from the shank to permit outward swinging movement of its hook end to a fish-impaling position. Triggering of the catch is caused by a striking fish applying opposing pressures to the lure body which reduces the frictional pressure between the catch and shank to free the shank for swinging movement to the fish-impaling position.

3,646,700

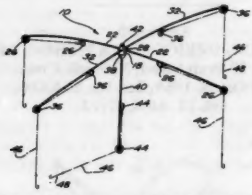
TAKE-APART FISH HOOK OR LURE SUPPORT

Robert B. Pond, South Attleboro, Mass., assignor to Atom Manufacturing Company, South Attleboro, Mass.

Filed Dec. 22, 1969, Ser. No. 886,917

Int. Cl. A01k *91/00, 83/00*

U.S. Cl. 43—42.74 **10 Claims**



A fish hook or lure support of "take-apart" construction is disclosed which is formed from a plurality of laterally directed wire arms each of which is provided with an integral loop from which hooks, filaments or lures may depend. The device assumes the shape of the so-called "umbrella" spreaders and includes in releasably connected to the laterally directed arms. Each of the laterally directed arms is embedded in a centrally located, slotted plug element preferably of metal. The vertical arm is embedded, at its uppermost end, in a plug element from which a vertical loop extension projects upwardly. The latter is fitted within the slots of the other plug elements to effect an assembled relationship of parts. The frictional contact of these parts assures the maintenance of the elements of the device in the aforesaid assembled relationship.

3,646,701

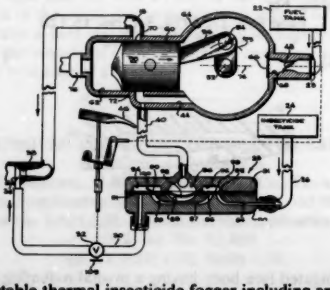
PORTABLE THERMAL FOGGER

Arthur Pfaffenbach, Watertown, Wis., assignor to McGraw-Edison Company, Elgin, Ill.

Filed May 4, 1970, Ser. No. 34,054

Int. Cl. A01m *19/00*

U.S. Cl. 43—129 **6 Claims**



A portable thermal insecticide fogger including an internal combustion engine for generating hot exhaust gases that discharge from an outlet, a supply of liquid insecticide, and a diaphragm pump operated off the changing pressures of the internal combustion engine for pumping the liquid insecticide to a location upstream of the outlet for admixture and common discharge with the exhaust gases.

3,646,702

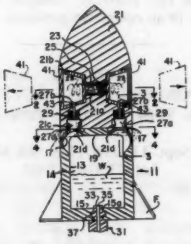
PROPELLED TOY ARRANGEMENT

Reginald F. Pippin, Jr., Towson, Md.

Continuation-in-part of application Ser. No. 504,299, Oct. 24, 1965, now Patent No. 3,510,980, dated May 12, 1970. This application May 11, 1970, Ser. No. 36,120

Int. Cl. A63h *27/06*

U.S. Cl. 46—74 A **13 Claims**



A missile arrangement including a first missile-launching unit having one or more female openings for receiving one or more separable propellable missile units. This first missile-launching unit is disclosed in the preferred form of a self-propelled missile having a fluid discharge orifice and a pressurizable fluid-pressure responsive flexible diaphragm which enables retention of the propellable missile unit within the female opening and release therefrom by respectively pressurizing and depressurizing the first unit. Embodiments with two separable propellable missile units are illustrated, embodying both self-propulsion of the separable propellable missile unit or units, and passive propulsion by external propulsion means on, and/or effected by motive action of, the first launching unit.

3,646,703

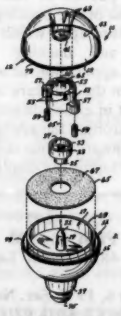
SPARKING TOY TOP

Albert R. Baginski; Jacob De Gelder, both of Torrance, and Gabriel Marason, Jr., Los Angeles, all of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Dec. 9, 1970, Ser. No. 96,378

Int. Cl. A63h *33/36*

U.S. Cl. 46—48 **4 Claims**



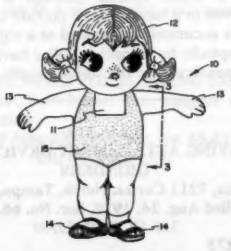
A toy top having a housing with a gyroscopic-type rotor mounted on a freely rotatable shaft that extends below the

housing and terminates at a spinning tip which supports the top in spinning engagement with a playing surface, the toy including pyrophoric means such as flints mounted on a shaft-encircling casing which has axial freedom but which is keyed to the housing, the flints slidably resting upon abradant means such as a sandpaper disc mounted on top of the top's rotor so that sparks are created by the rotation of the shaft with respect to the housing which are visible to its user through a transparent portion of the top's housing.

3,646,704
MANIPULABLE AMUSEMENT DEVICE
Orval T. Ellsworth, 840 Miranda Green, Palo Alto, Calif.
Filed July 13, 1970, Ser. No. 54,265
Int. Cl. A63h *3/06*
U.S. Cl. 46—90 **11 Claims**

A manipulable amusement device formed of a substantially airtight flexible enclosure having an opening, particulate matter loosely filling the enclosure, and a one-way valve seated in the enclosure opening for evacuating air from the enclosure and preventing air from reentering through the enclosure. The enclosed particulate material exhibits a range of conditions from fluid through moldable to hard, depending upon the extent to evacuation of the enclosure.

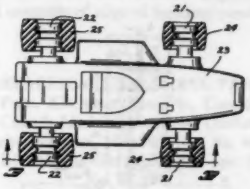
3,646,705
DOLL CUTOUTS AND PROCESS OF MAKING SAME
Iver Val Nicholson, Salt Lake City, Utah, assignor to Kiddie World Toys, Ltd., Salt Lake City, Utah
Filed June 10, 1970, Ser. No. 45,120
Int. Cl. A63h *9/00*
U.S. Cl. 46—157 **2 Claims**



A process of making a low-cost doll cutout having a realistic appearing undergarment to which fabric outer garments can be attached and from which they can be removed; and the doll cutout so produced.

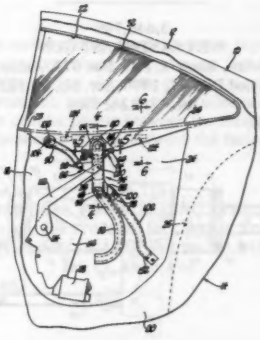
3,646,706
TOY VEHICLE
Cecil F. Adickes, Playa Del Rey, Calif., assignor to Tonka Corporation, Mound, Minn.
Filed June 25, 1970, Ser. No. 49,599
Int. Cl. A63h *17/00*
U.S. Cl. 46—201 **4 Claims**

A miniature toy vehicle having front and rear wheels and adapted to be propelled over a hard floor surface wherein the rear wheels are formed of a material having a higher coefficient of friction than the front wheels with respect to said



floor surface to aid true tracking of the vehicle over the surface.

3,646,707
WINDOW REGULATOR
Leonard A. Lystad, Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed Nov. 2, 1970, Ser. No. 86,098
Int. Cl. E05f *11/52*
U.S. Cl. 49—227 **4 Claims**

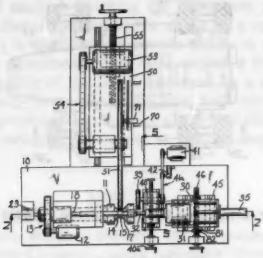


A vehicle window regulator which combines in a single unit means for supporting a window on a vehicle body for bodily movement between open and closed positions and means for laterally stabilizing the window, the window regulator including a first arm attached to the window for lateral rigidity and for pivotal movement about a fixed axis of the window, a second arm connected to the window and to the first arm, and a lift arm connected to both the first and second arms. The first arm laterally stabilizes the window in the closed position thereof and the lift arm cooperates with guide means on the vehicle body in defining separate curvilinear paths of motion for the first and second arms, the curvilinear path of motion of the window between the open and closed positions being the resultant of the curvilinear paths of the first and the second arms.

3,646,708
GRINDING MACHINERY AND METHODS
Robert S. Jones, Springfield, Vt.
Original application Jan. 9, 1967, Ser. No. 607,957, now Patent No. 3,524,283, dated Aug. 18, 1970. Divided and this application May 8, 1970, Ser. No. 35,804
Int. Cl. B24b *7/00*
U.S. Cl. 51—5 **7 Claims**

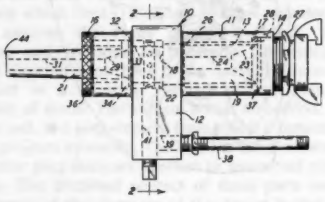
A grinding machine for grinding the external and internal surfaces of a workpiece, comprising a grinding wheel which

is rotated about its axis and moved to simultaneously contact a first cutter wheel rotating about its axis and a workpiece rotating about its axis, such that the axis of the workpiece and the axis of the cutter wheel lie in substantially the same



vertical plane and are spaced less than 180° from each other about the circumference of the first grinding wheel. The apparatus may also include a second grinding wheel which is adapted to be rotated and moved to operate on the internal surface of the workpiece or to contact a second cutter wheel.

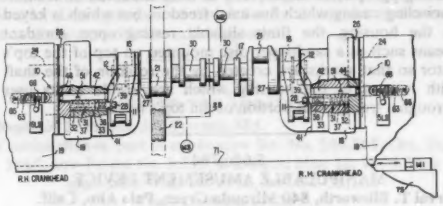
3,646,709
WET SANDBLAST GUN
Matthew P. Nolan, Route 1, P.O. Box 673, Antioch, Ill.
Filed Dec. 17, 1970, Ser. No. 99,123
Int. Cl. B24c *3/06*
U.S. Cl. 51—8 **3 Claims**



A gun housing including a barrel having a cylindrical opening extending through the barrel. Replaceable parts are located within the barrel for receiving sand in one end of one of the parts and for directing it to the other parts for flow through the gun. A water jacket part is provided in the barrel and a water inlet opening and a water connection are incorporated in the housing for introducing water into the chamber where the sand and water are mixed for flow of the wet sand from the outlet end of the gun.

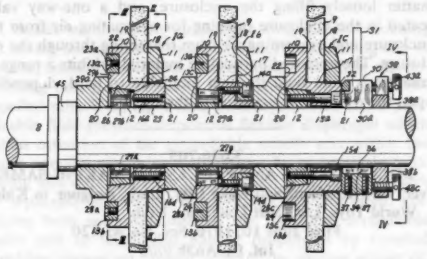
3,646,710
SAFETY DEVICE FOR PRECISION ROTARY LOCATION OF CRANK FIXTURES IN A MACHINE TOOL
William P. Flohr, Jr., Waynesboro, Pa., and John A. Boller, Thurmont, Md., assignors to Landis Tool Company
Filed Mar. 25, 1970, Ser. No. 22,614
Int. Cl. B24b *5/42*
U.S. Cl. 51—105 SP **18 Claims**

A latch blocks the opening of workpiece clamping arms in a machine tool, such as a crankpin grinding machine, until the crank fixtures are precisely angularly located. As the latch releases the clamping arms, a plunger is urged into an aperture in each crankhead positively locking the crank fixtures to the crankhead in the proper angular position for loading and unloading workpieces. Movement of the plunger



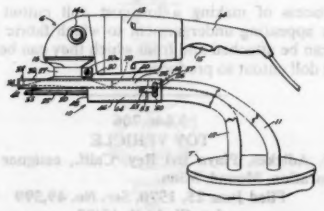
into the crankhead closes a switch completing a circuit to open the clamping arms.

3,646,711
MOUNTING ADAPTER ASSEMBLY
Kenzaburo Oishi, and Osamu Toyozumi, both of Kariya, Japan, assignors to Toyoda Koki Kabushiki Kaisha, Kariya-shi, Japan
Filed Aug. 10, 1970, Ser. No. 62,538
Claims priority, application Japan, Aug. 12, 1969, 44/77002
Int. Cl. B24b *41/00*
U.S. Cl. 51—168 **9 Claims**



A wheel sleeve having a grinding wheel is securely mounted on a wheel spindle through a resilient collet member received in a tapered bore portion thereof such that wheel sleeve is accurately positioned at a right angle relative to the wheel spindle by a spacing collar having end surfaces which are perpendicular to the wheel spindle.

3,646,712
DUST-REMOVING ATTACHMENT DEVICE FOR POWER GRINDERS
Pedro Quintana, 7211 Cortez, North, Tampa, Fla.
Filed Aug. 24, 1970, Ser. No. 66,284
Int. Cl. B24b *55/06*
U.S. Cl. 51—273 **10 Claims**



A dust-removing attachment device for rotary disk power grinders or sanders is described wherein a continuous current

of air is maintained over and around the grinding or sanding surface to capture and withdraw dust particles and the like into a vacuum chamber. Filtered and pressurized exhaust air from a vacuum cleaner tank is directed through a first plenum to discharge forcefully about the rotary disk at one side, and a vacuum plenum open at the other side of the disk and leading to the input of the vacuum cleaner serves to maintain a strong current of dust capturing circulating air.

3,646,713

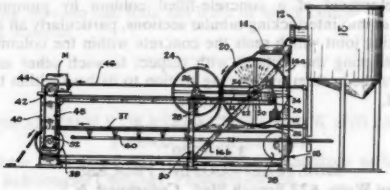
METHOD OF MAKING FRAGMENTED CRYSTALLINE MATERIAL

Douglas Woodworth Marshall, Niagara Falls, Ontario, and Edgar A. Pett, Chippawa, Ontario, both of Canada, assignors to Norton Company, Worcester, Mass.

Continuation-in-part of application Ser. No. 679,277, Sept. 22, 1967, now abandoned , which is a division of application Ser. No. 482,654, July 8, 1965, now Patent No. 3,377,660, which is a division of application Ser. No. 104,317, Apr. 20, 1961, now abandoned. This application Mar. 16, 1970, Ser. No. 19,736

Int. Cl. B24d *3/02*

U.S. Cl. 51—309 **12 Claims**



A method utilizing a trough for flowing molten abrasive material from a furnace onto a cool rotating casting cylinder, rapidly solidifying it into a thin semisolid curved sheet, densifying the semisolid material with a pressure roll, and then partially fracturing the strip of semisolid material by reversing its curvature by pulling it away from the cylinder with a driven rapidly cooled conveyor means whereupon the partially fractured strip is deposited onto collecting means in the form of large fragments which upon being rapidly cooled and solidified break up into smaller fragments well adapted to be reduced in size to form conventional abrasive particles.

3,646,714

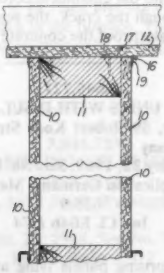
CLOSURE MOLD FOR BUILDING PANELS

Marshall O. Groat, Fort Payne, Ala., assignor to Kingsberry Home Corporation

Filed June 22, 1970, Ser. No. 48,011

Int. Cl. E04h *1/00*

U.S. Cl. 52—241 **2 Claims**



Closure mold between flat surface of building and adjacent edge of building panel having structural member along edge thereof. First flexible strip spans edge of panel with one side of strip along and secured to adjacent portion of structural member. Second flexible strip integral with side of first strip opposite said one side and extends angularly therefrom alongside and inwardly of edge of building panel.

3,646,715

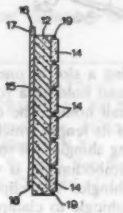
PREFABRICATED BUILDING PANEL

Kenneth W. Pope, Kitchener, Ontario, Canada, assignor to Du Pont of Canada Limited, Montreal, Quebec, Canada

Original application Aug. 31, 1967, Ser. No. 664,752, now abandoned. Divided and this application Apr. 6, 1970, Ser. No. 31,056

Int. Cl. E04c *2/10*

U.S. Cl. 52—309 **7 Claims**



A prefabricated building panel having a layer of cellular plastic such as polyurethane foam, to one face of which are bonded bricklike facing elements spaced from one another. A granular material, such as sand, is adhered to and embedded in the cellular plastic between the facing elements to give the appearance of mortar between the facing elements.

3,646,716

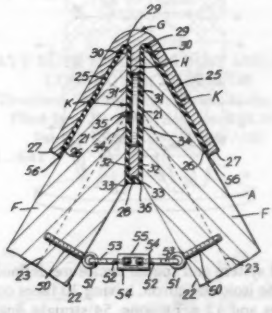
WEATHER SEAL FOR BUILDING STRUCTURES

Myron Jenner, c/o Jen Products, Inc., Bethel, Vt.

Filed Feb. 11, 1970, Ser. No. 10,464

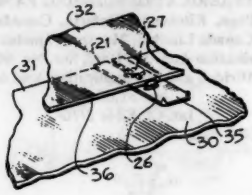
Int. Cl. E04b *1/68*

U.S. Cl. 52—403 **7 Claims**



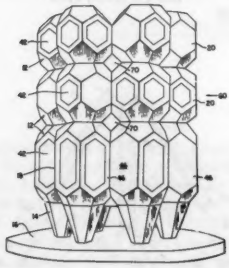
Two elements of a building structure, such as upright modules or upwardly converging frame sections, are separated by an elastic joint including a rigid member with a three-legged profile, the central leg of the profile lying between confronting faces of the building elements while the two other legs extend laterally thereof on the outside of the structure. An insert of elastomeric sheet material is interposed between the building elements and the adjoining lateral legs of the rigid member, a tongue of this insert enveloping the central leg thereof and penetrating under pressure into cutouts of that leg.

3,646,717
ROOFING CLIP
Eddie R. Parker, 1515 Winfield Avenue, Indianapolis, Ind.
Filed Oct. 17, 1969, Ser. No. 867,302
Int. Cl. E04d *1/22, 1/34*
U.S. Cl. 52—548 3 Claims



A roofing clip having a slot at one end which is slipped over the shank of a nail holding a roofing shingle in place prior to driving the nail home. The clip has a locating tab positioned centrally of its length which, in one embodiment, is received in a roofing shingle slot to position the clip, and which, in the other embodiment, is used for positioning a further overlapping shingle. The clip is centrally bendable over the overlapping shingle to clamp it in place and at the distal end of the bent over portion has one or more gripping projections which hold the overlapping shingle in place.

3,646,718
POLYHEDRAL STRUCTURAL SYSTEM AND SPATIAL ENCLOSURE
John E. McKenna, 740 Shotwell, San Francisco, Calif.
Filed July 3, 1969, Ser. No. 838,811
Int. Cl. E04b *1/348*
U.S. Cl. 52—79 2 Claims

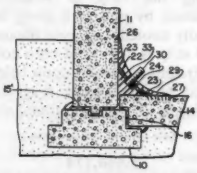


A structural system and spatial enclosure defined by a new polyhedron, the isoicosahedron, having 20 faces consisting of eight hexagons and 12 pentagons, 54 straight line elements, and 36 vertices, which, in a preferred form, lie on the surface of an imaginary sphere circumscribing the polyhedron. In the preferred form, the hexagons are regular and congruent while the pentagons though congruent are irregular having three sides equal in length to the side length of the hexagons and two sides equal to said length divided by the 2. In other forms, the 36 vertices of the polyhedron lie on the surface of an imaginary enclosing spheroid, oblate, elongate, or irregular. The isoicosahedra form modular units which can be reiterated in a building structure. The packed modular polyhedra define unique polyhedral spaces each having nine faces consisting of six pentagons and three squares, the endoenneahedron.

3,646,719
COLUMNAR JOINT
Bill Archer, Meridian, and John Low, III, Laurel, both of Miss., assignors to Arlo, Inc., Laurel, Miss.
Continuation-in-part of Ser. No. 23,216, Mar. 27, 1970
Filed May 15, 1970, Ser. No. 37,819
Int. Cl. E04h *12/34*
U.S. Cl. 52—115 2 Claims

Development of a concrete-filled column by pumping concrete into interlocking tubular sections, particularly an interlocking joint which seals the concrete within the columns while aligning the sections with respect to each other and anchors the bottom telescoping section to its base within the ground.

3,646,720
MOISTUREPROOFING PROCESS
Leonard Watts, 623 Branch Blvd., Cedarhurst, N.Y.
Filed Sept. 10, 1969, Ser. No. 856,592
Int. Cl. E02d *31/02;* E04g *23/02*
U.S. Cl. 52—744 2 Claims

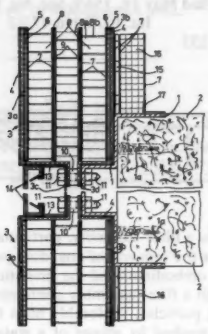


Cracks or joints in below ground level concrete construction are sealed by the process of bonding a strip of material over the crack to form a channel extending along the crack, pumping air into the channel under the strip to indicate the rate of leakage through the crack, and pumping a more or less viscous sealer into the channel according to the indicated rate of leakage through the crack, the sealer flowing into the crack to seal and waterproof the concrete construction.

3,646,721
WALL UNITS WITH INSULATION
Otto Alfred Becker, 59 Robert Koch Strasse D-6600, Saarbrucken 6, Germany
Filed May 22, 1969, Ser. No. 826,958
Claims priority, application Germany, May 22, 1968, P 17 59 635.9
Int. Cl. E04b *1/74*
U.S. Cl. 52—618 5 Claims

A wall unit comprising panels lying at opposite faces of said unit, a seal arranged between the margins of said panels, and an insulation occupying the cavity between said panels, wherein the improvement comprises at least one insulating

group extending parallel to said panels and comprising two foils capable of reflecting thermal radiation and chambers

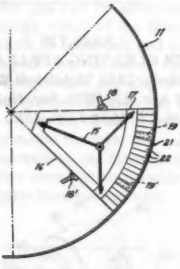


lying between said foils, the walls of which consist of insulating material.

3,646,722
PREASSEMBLY OF REFRACTORY BRICK AND LINING FURNACES THEREWITH

Victor John Salmi, III, Langhorne, Pa., assignor to General Refractories Company, Philadelphia, Pa.

Filed Sept. 2, 1969, Ser. No. 854,634
Int. Cl. E04g *21/14, 23/02*
U.S. Cl. 52—745 **9 Claims**



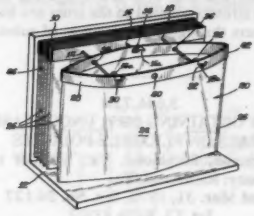
Refractory brick are preassembled into configuration matching a furnace to be lined and are retained together for transporting into place in the furnace. The resulting assembly is releasably secured mechanically or magnetically to suitable transporting means.

3,646,723
SYSTEM FOR FILLING A FLEXIBLE SEALABLE CONTAINER

Albert H. Meroney, 5628 South Washington Street, Hinsdale, Ill.

Filed Oct. 23, 1968, Ser. No. 771,384
Int. Cl. B65b *67/12*
U.S. Cl. 53—390 **8 Claims**

A flexible bag and device for supporting such bags in an open position to facilitate rapid filling. The device includes adjustable support means to enable its use with bags of various sizes. The bag includes means to cooperate with the sup-

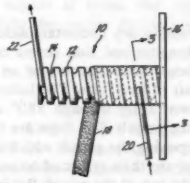


port means and prevent variations in the size of the bag opening during filling.

3,646,724
CENTRIFUGAL FILTER

Thomas W. Peck, Horseheads, N.Y., assignor to Powers Manufacturing, Inc., Elmira, N.Y.

Filed Jan. 9, 1970, Ser. No. 1,659
Int. Cl. B01d *45/12*
U.S. Cl. 55—274 **4 Claims**

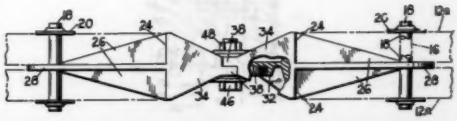


A centrifugal filter is disclosed wherein solid matter entrained in a fluid can be separated by centrifugal force into contact with an adhesive surface such as a pressure-sensitive tape which partially defines a fluid flow path.

3,646,725
HEAVY DUTY PITCHED TRUSS AND RIDGE CONNECTOR THEREFOR

Arthur L. Troutner, Skyline Drive, Boise, Idaho

Filed Dec. 29, 1969, Ser. No. 888,417
Int. Cl. E04c *3/292;* **F16b** *1/00*
U.S. Cl. 52—641 **3 Claims**



A heavy duty pitched truss comprises upper and lower chords interconnected by a lacing of link members. The pitched upper chord is formed in two end-to-end sections interconnected by a ridge connector. The ridge connector is formed in two pieces each comprising a bearing support, securing means for securing the bearing support on the end of one of the upper chord sections, and concavely arcuate and convexly arcuate bearing members projecting outwardly from the support and laterally offset from each other. The convexly arcuate bearing member of one piece overlaps the

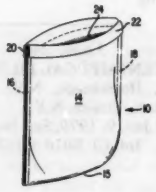
like member of the companion piece, both being in mating, bearing engagement with the concavely arcuate members of the respective pieces. A suitable connector such as a pivot pin interconnects the two overlapped bearing members. In this manner the stresses applied to the truss are transferred to the truss members through bearing areas of substantial magnitude.

3,646,726

METHOD OF OBTAINING DRY, UNCONTAMINATED SEALS ON FLEXIBLE POUCHES

James L. Hutcheson, Richmond, Va., assignor to Reynolds Metals Company, Richmond, Va.

Filed Mar. 31, 1970, Ser. No. 24,127
Int. Cl. B65b *43/02*
U.S. Cl. 53—29 **2 Claims**



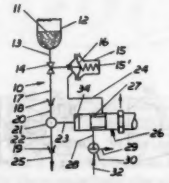
A method of obtaining dry uncontaminated seals on flexible pouches. The longitudinal side seams of the pouch are sealed to within about three-quarters of an inch of the top thereof leaving a pair of free flaps. The latter are then folded rearwardly and downwardly through 880° against the front and rear panels of the pouch. The flaps are then immobilized in this position by opening the pouch which is then filled with a product. The flaps are then returned to an upright position such as by pulling the top of the pouch flat in a togglelike action and sealed preferably with a slight overlap of the original side seam seal.

3,646,727

AUTOMATIC COMPRESSOR DRAIN SYSTEM

Erich A. Wachsmuth, 1810 Ridgemoor Drive, Long Beach, Michigan City, Ind.

Filed June 2, 1969, Ser. No. 829,369
Int. Cl. B01d *57/00*; **F16t** *1/16*
U.S. Cl. 55—21 **10 Claims**



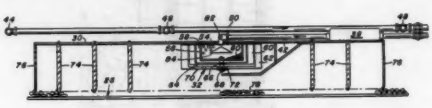
Method and apparatus for automatically draining liquid condensate from a body of compressed gas wherein a condensate drain valve is automatically opened at stated intervals causing liquid to pass through a drain system which is provided with a sensing chamber inserted between a pair of orifices so that the pressure change accompanying the end of liquid flow and the beginning of gas flow can be employed to cause immediate closure of the drain valve with a minimum loss of air.

3,646,728

FILTER ASSEMBLY AND SYSTEM FOR THE REMOVAL OF COAL DUST

George J. Holler, Jr., 210 S. Marietta Street, St. Clairsville, Ohio

Filed May 16, 1969, Ser. No. 825,317
Int. Cl. B01d *47/02*
U.S. Cl. 55—233 **4 Claims**



Described is a filter assembly, particularly adapted for use in a system for the removal of coal dust particles from air in a mine. In one embodiment of the invention, dust-laden air is passed through a filter assembly containing a filter bed comprised of slag particles, preferably blast furnace slag, that is continuously washed by means of a water spray. The water and dust particles washed from the filter bed form a slurry which flows from the filter bed onto a conveyor where it is conveyed out of the mine. The dust-laden air, after it passes through the filter bed, passes back into the atmosphere as filtered air substantially free of dust particles. In another embodiment of the invention, the dust-laden air is passed through a liquid bath, preferably a continuously circulating stream of water, whereby the coal dust will become trapped within the water while clean air bubbles upwardly out of the water and to a clean air duct.

ERRATUM

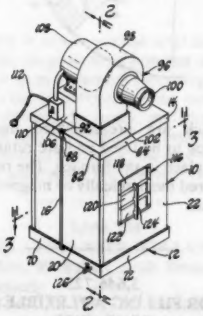
For Class 55—274 see:
Patent No. 3,646,724

3,646,729

AIR CLEANING APPARATUS

Donald B. McKechnie, 2843 Middlebelt Road, Pontiac, Mich.

Filed Apr. 23, 1970, Ser. No. 31,214
Int. Cl. B65b *1/00, 3/00, 5/00*
U.S. Cl. 55—278 **4 Claims**



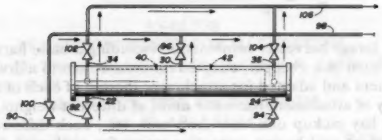
An air cleaning apparatus has a wire-basket body with a layer of filter material placed therein against the sidewalls and bottom to define a chamber which communicates with the discharge side of a blower assembly mounted atop a cover which is situated over the upper open end of the wire-basket body and chamber; tensioning type of bolts serve to hold the wire-basket body and cover in assembled condition

permitting the apparatus to be moved to selected locations; the intake side of the blower assembly is exposed to atmosphere or atmospheric mist to be filtered in order to pump such atmosphere into the chamber and through the filter material to thereby clean the air of the atmosphere and return such cleaned air to a designated area.

3,646,730
NATURAL GAS FILTER

Laurance S. Reid, 601 Broad Lane, Norman, Okla.

Filed Apr. 1, 1969, Ser. No. 811,779
Int. Cl. B01d *46/04*
U.S. Cl. 55—302 **6 Claims**



A filter for natural gas having an elongated cylindrical shell capped by a pair of quick-opening end closures. Gas enters through inlets adjacent the opposite ends of the shell and passes inwardly through a pair of filter assemblies to a centrally located main outlet. A blowdown outlet is provided at each end of the shell. Flow through each of the two inlets and each of the three outlets is selectively controlled by separate valves so that gas can be selectively passed in the reverse direction through either of the filter assemblies during low flow rate periods to backflush and clean the filter assembly without taking the system out of operation. Each of the filter assemblies comprises a plurality of cylindrical filter elements extending longitudinally from the upstream face of a pressure bulkhead within the vessel to permit easy replacement of the filter elements through the quick-opening end closures. In normal operation, gas flows from the exterior to the interior of the filter elements to provide maximum filter surface area and a higher blowout pressure.

ERRATUM

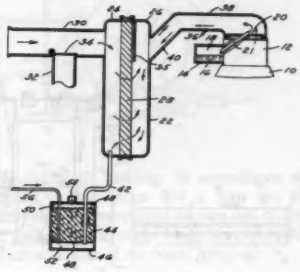
For Class 55—314 see:
Patent No. 3,646,734

3,646,731
AIR CLEANER AND FUEL VAPOR STORAGE ASSEMBLY REMOTELY ASSOCIATED WITH AN ENGINE

Gunnar W. Hansen, Ypsilanti, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sept. 2, 1970, Ser. No. 68,834
Int. Cl. B01d *53/04;* **F02m** *59/00*
U.S. Cl. 55—316 **14 Claims**

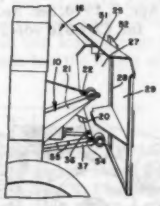
The engine air cleaner is essentially vertically disposed in a side-by-side relationship to the carburetor. The two are connected by a conduit in a manner that the lower portion of the air cleaner acts as a vapor trap to prevent excess carburetor float bowl vapors from passing out through the air cleaner air inlet into the atmosphere. A bed of activated carbon is connected to the lower portion of the air cleaner casing to store the excess fuel vapors at times, the vapors being purged therefrom back into the engine during normal engine operation.



3,646,732
CROP HARVESTER

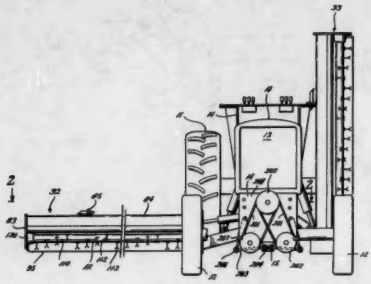
Glenn Dale Head, Des Moines, Iowa; Howard C. Hadley, Dallas Center, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Apr. 28, 1971, Ser. No. 138,109
Int. Cl. A01d *45/02*
U.S. Cl. 56—2 **6 Claims**



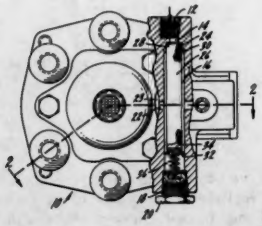
In a pull-type crop harvester having a main frame and a forwardly directed tongue adapted for connection at its forward end to a tractor drawbar, there is provided on the frame a crop-treating mechanism with a rearwardly directed elevator. The elevator has a housing extending to a forwardly opening inlet and surrounding the inlet is a housing extension that is carried on a transverse horizontal axis and which has a hydraulic cylinder connected thereto for moving the extension about the axis. The extension has means thereon for connecting it to a forwardly positioned harvesting unit.

3,646,733
SIDE FLAIL MOWER
George Sherl Clapsaddle, Jr., c/o Clapsaddle Sales and Services, Whitten, Iowa
Filed Mar. 17, 1970, Ser. No. 20,251
Int. Cl. A01d 35/24
U.S. Cl. 56—7 9 Claims



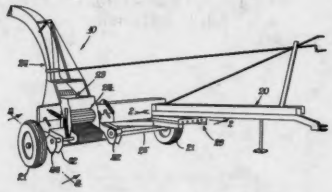
Outrigger is longitudinally hinged at inner edge to tractor and at outer edge to ground-supported cutter unit. Outrigger positions cutter as far to side of tractor as tractor wheels or beyond. Outrigger hydraulic cylinder connects outrigger to tractor to swing outrigger up and down, about inner hinge axis, thereby to raise and lower outer hinge axis to adapt cutter to terrain. Cutter hydraulic cylinder connects cutter to tractor at inner hinge axis to swing cutter up and down about outer hinge axis without preventing independent operation of outrigger cylinder. Cutter can be swung up to near vertical position with cutter cylinder and then hook on cutter can be dropped into eye on tractor by lowering outrigger with outrigger cylinder, thereby mechanically locking cutter in elevated position. Cutter is of flail type and is powered from front end of tractor crankshaft through a drive train. Inner end of flail shaft is above inner hinge axis by radial distance from shaft to cutter at end of flail, thereby to maintain inner edge of swath cut by cutter unit fixed at outer edge of outrigger regardless of angle of cutter to horizontal.

3,646,734
EMERGENCY FILTER FOR FLUID BRAKING SYSTEMS
Joseph L. Cannella, Melrose Park, Ill., assignor to The Berg Manufacturing Company, Des Plaines, Ill.
Filed Apr. 9, 1970, Ser. No. 27,087
Int. Cl. B01d 46/42
U.S. Cl. 55—313 1 Claim



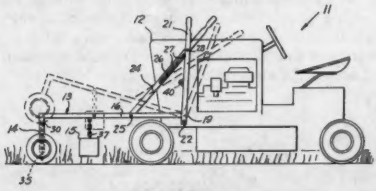
An emergency filter means for use with an airbrake system relay valve or the like. A filter of a cylindrical shape is located in a filter chamber communicating with the emergency line inlet and a valve chamber so that fluid enters the inlet, passes through the filter to the relay valve chamber. In the event the filter becomes blocked by foreign matter, the force of the flow of fluid will unseat the filter by compressing a spring holding it in place, thereby permitting the fluid to bypass the blocked filter.

3,646,735
FORAGE HARVESTER COMBINATION
Edward A. Fritz, Hinsdale, Ill., assignor to International Harvester Company, Chicago, Ill.
Filed May 11, 1970, Ser. No. 36,199
Int. Cl. A01d 69/00
U.S. Cl. 56—14.7 10 Claims



A forage harvester combination including a basic harvester unit such as a chopper, adapted for securement to a draft implement and adapted for attachment thereto of each of a plurality of attachment harvester units, of different weights, such as a hay pickup unit, row crop unit, etc., each different attachment unit having respective pairs for anchoring it with the basic unit positioned according to its weight; means for raising and lowering the attachment unit for positioning it at different parallel operating levels, and for raising it to a higher tilted transport position; and resilient means for cushioning the lowering of the attachment unit to prevent breakage in the event it encounters a nonyielding obstacle.

3,646,736
ATTACHMENT FOR A RIDING-TYPE LAWNMOWER
Frank B. Hutchins, 67 Pinedale Road, Asheville, N.C.
Filed Jan. 6, 1970, Ser. No. 944
Int. Cl. A01d 35/26
U.S. Cl. 56—16.9 8 Claims

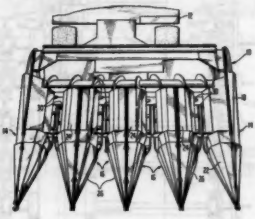


A riding lawnmower provided with a wheeled pivoted forward extension carrying a transverse depending rake assembly and a freely suspended transverse magnet bar assembly spaced behind the rake assembly. The extension has a slotted pivoted lever which can be interlocked with another lever pivoted to the lawnmower to at time support the extension in an elevated inoperative position.

3,646,737
HARVESTING ATTACHMENT
Benjamin M. Grant, Route 1, Box 43, Pasco, Wash.
Filed Oct. 20, 1970, Ser. No. 82,333
Int. Cl. A01d 45/02
U.S. Cl. 56—106 24 Claims

A down corn attachment for mounting on the row dividers of a corn head for a combine. The row dividers have a

pointed snout mounted on their forward end for vertical pivotal movement to accommodate ground irregularities. The down corn attachment includes a conveyor chain driven about an endless path including a conveying run extending

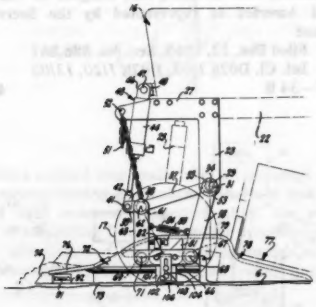


from the forward point of the snout along the top surface of the row divider to the rear thereof. The conveyor chain is employed to apply a moment to the snout about its pivot axis to support a portion of the cantilevered weight of the snout.

3,646,738
PLANT POSITIONER FOR HARVESTERS

George O. Tiura, Modesto, Calif., assignor to AgMac Inc., Ripon, Calif.

Filed Dec. 29, 1969, Ser. No. 888,735
Int. Cl. A01d *63/04*
U.S. Cl. 56—314 **7 Claims**



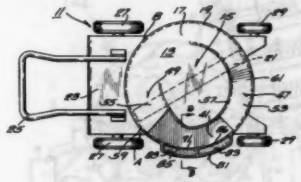
A harvesting vehicle for bean plants growing in rows in the earth has a plant positioner including, for each row harvested, a four bar linkage mounted at the front of the vehicle and adjustable up and down. One link is a generally horizontal lift plate carrying a leading point running along the ground and a following plant lifter. The linkage permits the point to move rearwardly against a spring and to rise when an obstacle is encountered. Also, a pusher is furnished for pushing aside plants in adjacent rows, for positioning earth near plant stems and for fully lifting partly lifted plants.

3,646,739
SAFETY LAWN MOWER

Einar S. Dahl, Galesburg, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Nov. 21, 1969, Ser. No. 878,865
Int. Cl. A01d *35/26*
U.S. Cl. 56—320.1 **22 Claims**

A lawn mower including a part of a housing for capturing solid particles thrown by action of the cutting blade. In one embodiment, the part of the housing comprises a penetrable liner extending adjacent to the path of the tip of the cutting blade and cooperating with the housing to form a series of pockets for receiving solid articles which penetrate the wall of the liner. In another embodiment, one or more pads of cellular material are carried by the housing in position to be struck by objects thrown by action of the cutting blade. Upon striking of the cellular material, the objects become imbedded, to thereby remove them from the whirling mass of

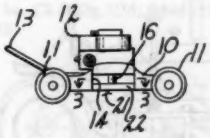


material within the blade housing. In accordance with the third embodiment, a trap door and a trap are provided whereby solid objects are permitted to pass out of the circular area of the path of travel of the blade, but are intercepted within a trap formed inside of the blade housing.

3,646,740
LAWNMOWER PROTECTIVE GUARD

John J. Grimes, Route 4, Box 554A, Selma, Ala.

Filed Aug. 12, 1970, Ser. No. 63,176
Int. Cl. A01d *35/26*
U.S. Cl. 56—320.2 **4 Claims**



Lawnmower having a guard extending across lower portion of discharge opening and embodying vertical flange outwardly of and in alignment with tip of rotary cutter blade and horizontal flange extending inwardly from upper edge of vertical flange over and in spaced relation to tip of cutter blade. Rear end of guard extends beyond trailing edge of discharge opening and forward end of guard extends forward from leading edge of discharge opening a distance equal substantially the distance from said leading edge to first tangent of exposure of cutter blade less the height of horizontal flange above cutter blade.

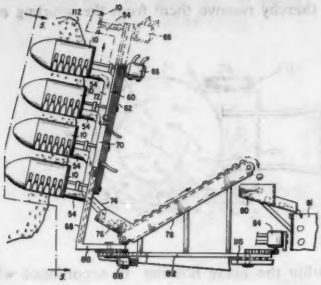
3,646,741
FRUIT HARVESTING APPARATUS

John W. Edwards, 208 Riverside Drive; John W. Eason, Jr., 206 Riverside Drive; Adrian R. Chapman, Route One Herd Bridge Road, and Emerson M. Clavel, 900 W. Palmetto Street, all of, Wauchula, Fla.

Continuation-in-part of application Ser. No. 860,329, Sept. 23, 1969, now abandoned. This application Feb. 13, 1970, Ser. No. 11,277
Int. Cl. A01g *19/00*
U.S. Cl. 56—328 R **11 Claims**

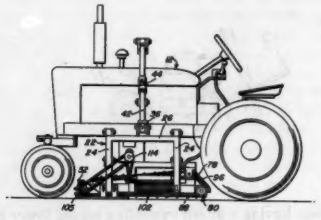
A crop harvesting apparatus particularly suited for the picking of tree-borne crops such as fruit and nuts. An elongated hollow cylindrical shell has a plurality of openings for the entry of fruit. Each opening terminates in a stem severing edge. The shell is thrust among the crops to be harvested and is rotated, removing the crops from the plants. An internal auger urges the fruit to a discharge from which it moves to a

suitable storage location. Means are provided to prevent mature ripened fruit from leaving the shell except through the



discharge and to permit immature green fruit to pass out the openings without being severed from the plant.

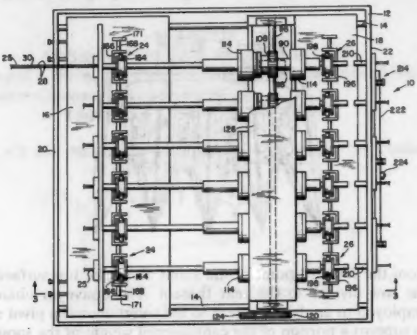
3,646,742
CUCUMBER PICKER
Lloyd E. Knutson, Route 1, Frederic, Wis.
Filed Nov. 20, 1970, Ser. No. 91,463
Int. Cl. A01d *45/00*
U.S. Cl. 56—327 R **14 Claims**



A picker, usually including a pair of picking units, mountable on a tractor through a hydraulically controlled support system whereby a selective raising and lowering of the units can be effected. Each unit includes a supporting framework mounted at one end so as to cantilever laterally in a manner which allows the vines to be raised, moved along and discharged from the individual units without a severing of the vines from the plant. Each unit includes a forward finger mounting pickup roller which raises the vines. The elevated vines are moved rearwardly over a carrier portion in a manner whereby the crop is suspended below the carrier portion and severed from the overlying vines by a cutter bar. The severed produce falls on a conveyor for a lateral discharge thereof while the vines are returned to the ground.

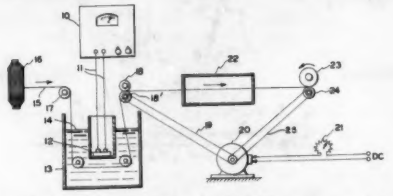
3,646,743
RECIPROCATING TWISTER PIPE CLEANER MACHINE
Eugene J. Boyd, Elmhurst, Ill., assignor to United States Tobacco Company, Nashville, Tenn.
Filed July 13, 1970, Ser. No. 54,483
Int. Cl. B21f *77/00*; A24f *9/06*; B21f *45/00*
U.S. Cl. 57—5 **15 Claims**

A machine for the continuous production of pipe cleaners includes first and second carriage members slidably mounted on a frame and adapted to be reciprocated between a first position wherein the carriages are located at opposite ends of the frame and a second position wherein the carriages are located adjacent each other and has chuck members thereon for gripping the pipe cleaner components in accordance with



the respective positions of the carriages and mounted for rotation on the carriages whereby the wires of the pipe cleaners are twisted about each other to lock short cotton fibrils therebetween and advance the pipe cleaner strand through the machine.

3,646,744
METHOD AND APPARATUS FOR BULKING YARN
Ralph A. Rusca, New Orleans, La., assignor to The United States of America as represented by the Secretary of Agriculture
Filed Dec. 22, 1969, Ser. No. 886,861
Int. Cl. D02g *1/02*; D02h *1/20*, *13/00*
U.S. Cl. 57—34 B **4 Claims**

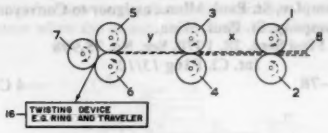


An apparatus utilizing ultrasonic components was designed and used in combination with select chemicals to produce permanent bulking in cotton and other yarns. The method constitutes immersing the yarns in cross-linking formulations and subjecting these while immersed to ultrasonic irradiation. An extension of the method comprises imparting resiliency to the bulked yarns. This is accomplished both by mechanical and by chemical means.

3,646,745
METHOD AND APPARATUS FOR MAKING STAPLE-FIBER YARNS
Tony Lewis Baldwin, and Roy Harold Burton, both of Harrogate, England, assignors to Imperial Chemical Idustries Limited, London, England
Filed Oct. 27, 1969, Ser. No. 869,778
Claims priority, application Great Britain, Nov. 8, 1968, 53,061/68
Int. Cl. D01h *5/22*, *5/26*
U.S. Cl. 57—36 **16 Claims**

A method and apparatus for making "cracker"-free staple fiber yarns from staple-fiber rovings provide one or two

drafting stages for the roving and a final stage which is a substantially zero draft stage and which wholly supports the roving during its passage therethrough. The length of the final stage is less than the effective staple length of the fibers in the roving.



3,646,746

BALLOON CONTROL RING

Coyt E. Murray, and Walter C. Boyter, both of Gastonia, N.C., assignors to Impact Plastics Inc., Gastonia, N.C.

Filed Mar. 12, 1970, Ser. No. 18,879
Int. Cl. D01h *13/04, 13/12*
U.S. Cl. 57—108 **5 Claims**

A balloon control ring made from an ultrahigh molecular weight polymer having a nonabrasive surface and both friction and heat resistant properties; thus, the ring, when adapted to a spinning frame processing synthetic yarns, permits the attainment of higher spinning speeds without the usual deleterious effects on the balloon control ring.

3,646,747

FALSE TWISTED RIBBONS

Alfred J. Strohmaier, Seaford, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 1, 1969, Ser. No. 846,711
Int. Cl. D02g *3/06*
U.S. Cl. 57—140 **5 Claims**

False twisting ribbons of from 100 to 2,000 denier using a mechanical false twisting spindle rotating at from 10,000 to 500,000 r.p.m. to produce a false twisted ribbon in which the ribbon is longitudinally folded on itself from both sides but contains substantially no twist but rather has embossed striations which give the appearance of a twist.

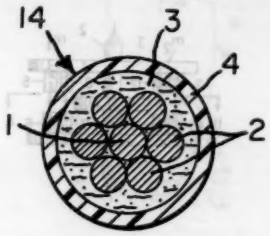
3,646,748

TENDONS FOR PRESTRESSED CONCRETE AND PROCESS FOR MAKING SUCH TENDONS

Frederic A. Lang, R.D. #1, Landenberg, Pa.

Filed Mar. 24, 1970, Ser. No. 22,249
Int. Cl. D07b *1/16, 7/14*
U.S. Cl. 57—149 **9 Claims**

A tendon suitable for posttensioning concrete and for use in other applications comprising a multiple-wire strand incased in a corrosion inhibitor in an amount sufficient to provide a circular enclosure greater than the outside diameter of the strand and having a seamless plastic jacket tightly covering said incased strand. A process of making said tendon which comprises the steps of coating and filling the interstices of a multiple-wire strand with a corrosion inhibitor,



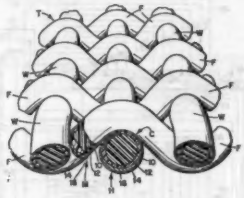
passing same through a circular die of a diameter greater than the strand to remove excess corrosion inhibitor and to form a circular enclosure of said inhibitor around said strand, and melt extruding a plastic jacket around said incased strand.

3,646,749

MACHINE-WASHABLE METALLIZED FIBROUS ARTICLE AND METHOD OF MAKING SAME

Philip J. Clough, Cape Elizabeth, Maine, and Allen H. Keough, Sudbury, Mass., assignors to King-Seeley Thermos Co., Ann Arbor, Mich.

Filed Dec. 24, 1969, Ser. No. 888,002
Int. Cl. D02g *3/36;* **B44d** *1/14*
U.S. Cl. 57—153 **10 Claims**



Fibrous article with heat-and-light reflecting quality provided by a metal coating on synthetic fiber substrates. The metal coating is undercoated and overcoated with resin systems. The article thus produced has functional heat and light-reflecting quality and decorative quality due to the metal coating of the fiber substrates due to the consistent with substantially retaining hand and softness of the fibrous article. The article is machine washable (i.e., retains its metal coat), abrasion and mar resistant, water repellent and dry cleanable consistent with high-moisture vapor transmission of the article (breathability).

3,646,750

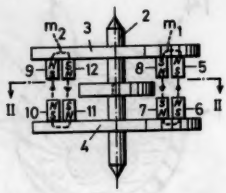
ELECTRONIC CLOCKWORK DRIVE

Robert W. Reich, Merzhauserstr. 143, Freiburg im Breisgau, Germany

Filed Mar. 27, 1970, Ser. No. 23,263
Int. Cl. G04c *3/04;* **H02k** *33/02*
U.S. Cl. 58—28 A **15 Claims**

The specification discloses an electronic clockwork drive in which an oscillator, which is oscillatable relative to a stationary coil, has two circumferentially spaced magnet systems, each comprising two circumferentially spaced

respectively oppositely polarized magnetic axes and each having an airgap. As the oscillator oscillates, each magnet system induces actuating voltage pulses in the coil when the respective magnet system is substantially centered over the coil and moving in a respective direction. The voltage pulses



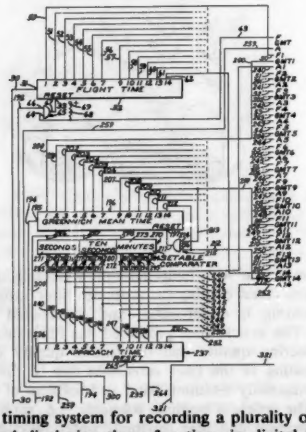
induced in the coil actuate a coil energizing circuit to supply a pulse of current to the coil, which delivers a drive impulse to the oscillator. Each magnet system thus develops a single drive impulse on the oscillator during each period of oscillation of the oscillator.

3,646,751

DIGITAL TIMING SYSTEM

Donald A. Purland, Eden Prairie, and Alan M. Gustafson, Minneapolis, both of Minn., assignors to Detection Sciences, Inc., Minneapolis, Minn.

Filed Dec. 5, 1969, Ser. No. 882,413
This application filed under Rule 47.
Int. Cl. G07c *1/00*; G04b *19/00*
U.S. Cl. 58—152 **12 Claims**



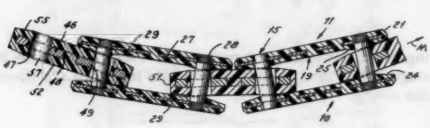
A digital timing system for recording a plurality of timing functions and displaying these functions in digital form. A high-frequency crystal control oscillator provides timing pulses which are fed to a pulse rate divider circuit which provides a plurality of outputs at different time rates. Each of the outputs of the divider circuit are fed to an individual counter circuit which counts the pulses to record a specified timing function. A digital display circuit is switchably connected between the outputs of each of the counter circuits to individually display the time recorded in each counter without disturbing the continued counting of the counters. The output of one of the counters is compared with a variable comparative circuit which can be preset over a range of predetermined times. When the output of the counter is equal to the preset time in the comparator, a signal is produced which will reset the counter and initiate an overtime count.

3,646,752

PLASTIC ENCASED METAL RIBBED FLEXIBLE CONVEYOR CHAIN

David H. Kampfer, St. Paul, Minn., assignor to Conveyor Specialties Company, St. Paul, Minn.

Filed Sept. 28, 1970, Ser. No. 75,998
Int. Cl. F16g *15/12*
U.S. Cl. 59—78 **4 Claims**



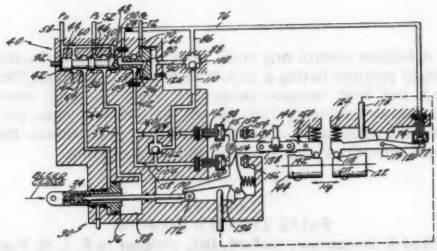
An improved flexible conveyor chain with side flexing capability while retaining good cross-sectional areas at stress positions. The chain structure is made of metal rib sections encased in plastic material which provides positive positioning and even cooling effects during manufacturing and strength in useage. The plastic material reduces or eliminates the need for chain lubrication. The edges of the chain elements have ramp edges to assist in ease of loading and unloading material to be moved by the conveyor chain.

3,646,753

ENGINE COMPRESSOR BLEED CONTROL SYSTEM

Michael E. Colman, Manchester, Conn., and Charles F. Stearns, East Longmeadow, Mass., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed Apr. 28, 1970, Ser. No. 32,688
Int. Cl. F02c *9/14*; F02k *5/00*; F02c *9/04*
U.S. Cl. 60—39.27 **10 Claims**



Control means for a compressor bleed for a turbine-type of power plant judiciously schedules the opening and closing thereof in accordance with a predetermined schedule while also assuring that the acceleration and deceleration limits controlled by the fuel control are not reached until the bleeds are in the full open position.

3,646,754

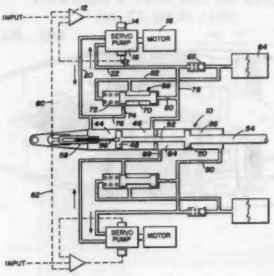
MOTOR OPERATED SERVO PUMP

Werner G. Koch; Robert H. Marchell, both of Arlington, and William G. Redmond, Dallas, all of Tex., assignors to LTV Electrosystems, Inc., Greenville, Tex.

Filed May 22, 1970, Ser. No. 39,732
Int. Cl. F15b *15/18*
U.S. Cl. 60—52 VS **13 Claims**

A power actuator in a hydraulic system is controlled in accordance with an electronic control signal energizing a variable displacement servo pump interconnected to the power actuator. In the hydraulic system, the variable displacement servo pump includes a swash plate directly coupled to and

positioned by an electric motor. A transducer responds to the position of the swash plate and generates a feedback signal to balance out the effect of the electronic control signal. A pressurized reservoir supplies a base pressure to the hydraulic system when the swash plate of the variable displacement



servo pump is in a neutral or null position. This reservoir is protected against an over pressure by a check valve. To compensate for unequal chamber volumes in the power actuator, a shuttle valve diverts excess fluid from the larger volume chamber to the reservoir.

3,646,755

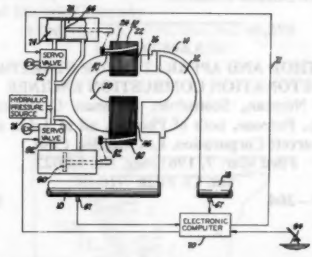
VARIABLE GEOMETRY TORQUE CONVERTER

Warren S. Sherman, Indianapolis; Dennis L. Troth, Speedway, both of Ind., and William A. Bennett, Danville, Ill., assignors to General Motors Corporation, Detroit, Mich.

Filed Sept. 14, 1970, Ser. No. 71,992

Int. Cl. F16d *33/00*

U.S. Cl. 60—54 **5 Claims**



This torque converter has a fluid flow control member with separate entrance and exit sections formed by packs of relatively movable discs with flow control passages therein. Controls are provided to relatively move the discs to vary converter geometry and the flow path through the entrance section to improve converter operating efficiency. Additional controls are provided to relatively move the discs of the exit section to vary converter geometry and change the fluid flow path through the exit section to provide for converter capacity control.

3,646,756

TRAPEZOIDIAL SCOOP TUBE

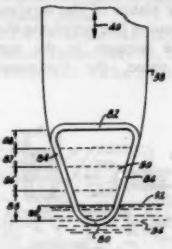
Henry J. Langlois, Detroit, Mich., assignor to American Standard Inc., New York, N.Y.

Filed Feb. 12, 1970, Ser. No. 10,759

Int. Cl. F16d *31/06*

U.S. Cl. 60—54 **4 Claims**

A variable speed fluid coupling having a scoop tube which has a trapezoidial fluid entrance opening such that the tube penetrates deeper into the fluid ring than conventional scoop tubes during constant speed operation; deeper penetration is believed to minimize bounce of the tube from the liquid ring.



Further penetration of the scoop tube into the ring (as for deceleration) exposes relatively large areas of the opening to the fluid so that fluid ring thickness is rapidly diminished for rapid declutching of the coupling.

3,646,757

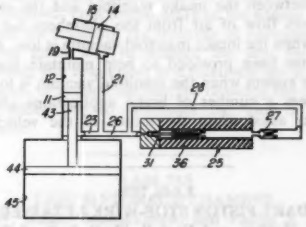
LOCK BOLT PLACING APPARATUS

John Stewart Sanders; Donald Stanley Savage, both of St. Albans, and Frederick Arthur Summerlin, Harpenden, all of England, assignors to Aerpat A.G.

Filed Sept. 29, 1969, Ser. No. 861,960

Int. Cl. F15b *7/00*; B25c *1/12*; F15b *15/18*

U.S. Cl. 61—54.5 HA **8 Claims**



The invention relates to a hydraulically operated lock bolt placing tool of the type comprising a double-acting master piston and cylinder and a double-acting slave piston and cylinder, connected together by two conduits to form a hydraulic intensifier. The relative size of the pistons is such that, on the return stroke, an excess of hydraulic fluid is generated in the return conduit. Connected to the return conduit is a hydraulic reservoir with a pressurized inlet valve. This ensures that, on the return stroke of the tool, pressure builds up in the return conduit to provide a force to pull the anvil off the swaged lock bolt collar. The hydraulic reservoir contains resilient sponge rubber.

3,646,758

VACUUM CONTROL FOR SERVOMOTOR

Maxwell L. Cripe, South Bend, Ind., assignor to The Bendix Corporation

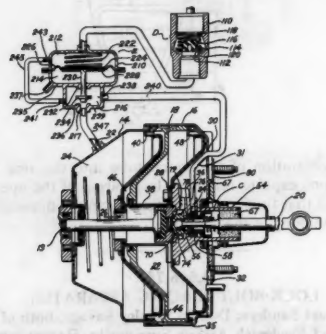
Filed Mar. 30, 1970, Ser. No. 23,638

Int. Cl. F15b *7/00*

U.S. Cl. 60—54.6 P **2 Claims**

A control for a power brake system having a servomotor as the source of power. The servomotor has a housing with a diaphragm dividing it into front and rear chambers. Vacuum from the intake manifold of a vehicle is supplied to the front and rear chambers to suspend a power piston attached to the

diaphragm member. A valve member secured to the rear chamber and responsive to movement of the brake pedal closes the vacuum communication in the rear chamber creating a pressure differential across the diaphragm member. This pressure differential causes the diaphragm member to move the power piston of the servomotor. A relay valve is placed in the vacuum line supplying the front and rear chambers. When the vacuum in the servomotor is below a predetermined value, the communication to the front



chamber is sealed thereby assuring a pressure differential across the diaphragm upon brake application. A check valve is placed between the intake manifold and the relay valve which allows flow of air from the chambers but prevents backflow when the intake manifold vacuum is low. A vacuum reservoir has been provided to help maintain the vacuum level in the system when the manifold vacuum is low. In this brake system a number of brake applications are assured with power assist when the motor of the vehicle is not running.

3,646,759

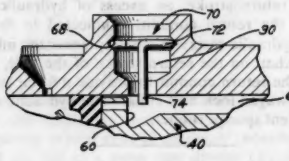
SECONDARY PISTON STOP-WIRE RETAINER RING

Harold W. Hughes, and Paul B. Shutt, both of St. Joseph, Mich., assignors to The Bendix Corporation

Filed Aug. 7, 1970, Ser. No. 61,884

Int. Cl. F15b 7/00; F16k 51/00

U.S. Cl. 60—54.6 R **4 Claims**



A novel stop for the secondary piston of a split master cylinder is disclosed. The stop includes a radially expandable, circumferentially extending portion received in a circumferentially extending groove provided in the secondary fill port of the master cylinder and another portion extending coaxially with the axis of the port that projects into the master cylinder bore. Movement of the secondary piston past the portion of the piston stop that projects into said bore is thereby prevented.

3,646,760

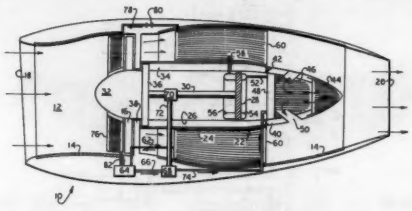
VAPOR CYCLE PROPULSION SYSTEM

Jack P. Waidelich, Bonita, Calif., assignor to Rohr Corporation, Chula Vista, Calif.

Filed June 1, 1970, Ser. No. 41,925

Int. Cl. F02k 3/06

U.S. Cl. 60—204 **15 Claims**



System comprises duct with entire power plant within a duct. Axial flow compressor driven by vapor turbine produces entire thrust in form of airflow. Combustor combines minor portion of airflow with fuel and burns mixture to produce heat for vaporizing suitable working fluid. Latter may be water, mercury, or one of the alkali metals. Vaporized fluid goes to turbine and operates it to drive compressor. Exhaust from turbine goes to condenser located in airflow so that all rejected heat is added to airflow within duct to increase its energy. The vaporizer and turbine may be located within a center body to conserve heat for shaft horsepower. Combustion gases mix with air within duct so there is no primary combustion gas jet. High velocity of airflow is still much lower than turbojet, producing considerable noise reduction. Lower temperature of air further reduces noise and makes possible maximum use of acoustic surfaces inside duct. All heat rejected or lost goes into airflow to produce maximum efficiency. High cycle efficiency results in low hydrocarbon exhaust emission.

3,646,761

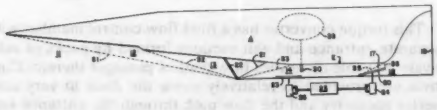
METHOD AND APPARATUS FOR STARTING DETONATION COMBUSTION ENGINES

Leslie W. Norman, Scottsdale; Skillman C. Hunter, and George L. Perrone, both of Phoenix, all of Ariz., assignors to The Garrett Corporation, Los Angeles, Calif.

Filed Mar. 7, 1961, Ser. No. 94,022

Int. Cl. F02k 7/10

U.S. Cl. 60—204 **8 Claims**



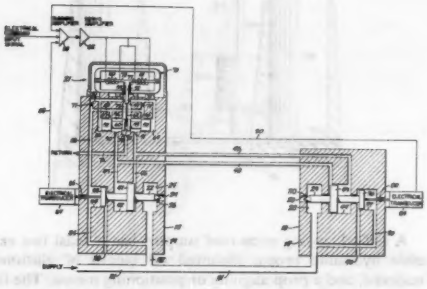
1. In a method of starting a detonation combustion engine having an aerothermodynamic duct which includes an adjustable inlet and an adjustable throat adjacent the combustion zone and is adapted to receive a hypersonic stream of air during normal operation, the steps comprising reducing the amount of air supplied by the inlet to the throat while simultaneously opening the throat until at least sonic velocity of the fluid stream is attained at the combustion zone, then gradually increasing the amount of air supplied by the inlet to the throat, feeding fuel into the fluid stream, and restricting the throat so as to adjust the flow to obtain the desired velocity, temperature and pressure for detonation in said combustion zone.

3,646,762

SECONDARY INJECTION THRUST VECTOR CONTROL

George W. Hawk; Lewis H. Geyer, both of East Aurora, N.Y.; Alfred J. Mastropole, Allendale, N.J., and Kenneth D. Garnjost, West Falls, N.Y., assignors to Moog, Inc., East Aurora, N.Y.

Filed Sept. 4, 1962, Ser. No. 221,079
Int. Cl. B63h *11/00*
U.S. Cl. 60—204 31 Claims



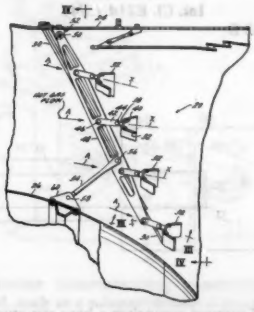
This invention relates to a method and apparatus for controlling the angular deflection of the thrust vector of a fluid stream discharged from the divergent section of a supersonic nozzle. In particular, the stream discharging from the nozzle is deflected by a fluid jet which is injected at a substantially constant velocity regardless of the amount of fluid injected.

3,646,763

GAS TURBINE ENGINE WITH IMPROVED AFTERBURNER

John K. Arand, Palos Verdes Peninsula, Calif., assignor to General Electric Company

Filed May 25, 1970, Ser. No. 40,298
Int. Cl. F02k *3/08*
U.S. Cl. 60—261 4 Claims



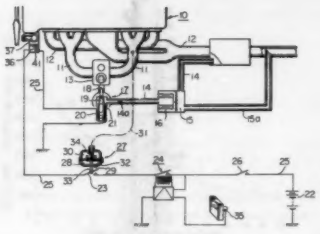
The disclosure shows an afterburner for a gas turbine engine comprising fuel injectors and concentric, annular, V-shaped gutters which function as flameholders. Links are pivotally mounted at their opposite ends to the gutters and to beams. The beams are pivoted on the outer casing of the afterburner and align the pivot axes of the links and the bisectors of the gutters with the direction of hot gas flow toward the gutters in the "hot" condition of the afterburner to prevent twisting of the gutters when their material strength is weakest.

3,646,764

AIR POLLUTION PREVENTIVE SYSTEM FOR MOTOR VEHICLES

Yasuo Nakajima, Yokosuka, and Yoshimasa Hayashi, Yokohama, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Apr. 27, 1970, Ser. No. 32,248
Claims priority, application Japan, May 30, 1969, 44/41638
Int. Cl. F01n *3/12*; F02m *25/06*
U.S. Cl. 60—279 3 Claims



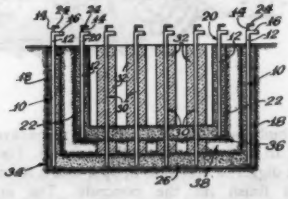
A vehicular air pollution preventive system with a unit or units constructed to reduce the quantity of nitrogen oxides and/or hydrocarbons under the control of means responsive to the engine temperature, and either one of the intake manifold vacuum, vehicle or engine speed, or a combination of any of these, which system includes control means responsive to a relatively cool temperature of the engine to deactuate the unit for reducing the quantity of nitrogen oxides in the exhaust gases and to actuate the unit for reducing hydrocarbons, and responsive to a relatively hot temperature of said engine to actuate the unit for reducing the quantity of nitrogen oxides and to deactuate the unit for reducing hydrocarbons.

3,646,765

LIQUID STORAGE CHAMBER

William W. Bodle, Bannockburn, and Phillip J. Anderson, Deerfield, both of Ill., assignors to Institute of Gas Technology

Filed May 19, 1969, Ser. No. 825,687
Int. Cl. B65g *5/00*
U.S. Cl. 61—.5 10 Claims

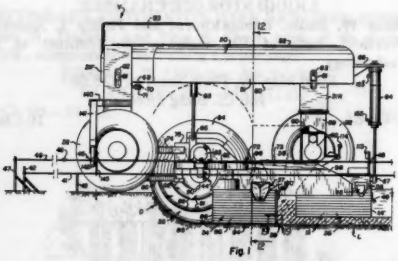


A below ground chamber for the storage of liquid gas at cryogenic temperatures and a method for constructing the same. An outer shell is formed and an inner shell is spaced interior of the outer shell so formed. The space between the two chambers is frozen under a controlled pressure for providing an internal stress in the frozen space. The unfrozen earth central of the frozen space is excavated to form the storage chamber and a roof is constructed over the chamber.

3,646,766
INSTALLATION OF SAND DRAINS
Joseph Lawrence Hilton, Oakland, N.J.; Charles Russell Graff, Incline Village, Nev., and Lewis Fred Cavin, San Lorenzo, Calif., assignors to Raymond International Inc., New York, N.Y.
Filed Aug. 23, 1968, Ser. No. 754,845
Int. Cl. E02b *11/00*
U.S. Cl. 61—11 11 Claims

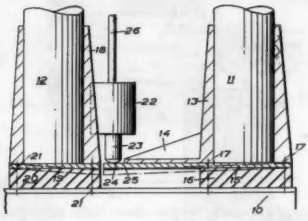
Methods and equipment for installing sand drains in water-bearing earth; an open-ended tubular shell is lowered into the earth while allowing the water-bearing earth to freely enter into the interior of the shell; a close-fitting auger is used to remove the water-bearing earth from the shell and then the shell is filled with sand and subsequently withdrawn from the earth thus leaving the sand to provide the desired sand drain.

3,646,767
DITCH BUILDING APPARATUS
Ned R. Shelley, 119 W. Jackson, Riverton, Wyo.
Filed Apr. 29, 1969, Ser. No. 820,223
Int. Cl. E02f *5/02*
U.S. Cl. 61—41 15 Claims



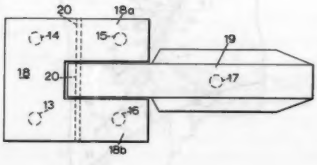
A ditch building apparatus adapted to excavate a ditch trench and to line the same with concrete. The apparatus combines a digger, a concrete hopper and a forming section adapted to finish off the concrete. The apparatus is suspended from a vehicle with adjustable suspension means to hold the same at a proper depth and grade and to hold it level even with the movement of the vehicle over an irregular ground surface. A pocket forming and pocket finishing apparatus is carried on the digger and forming section. The pocket forming apparatus includes a ram which cuts a pocket in the earth at the side of a ditch trench which is then filled with concrete. The notch finishing apparatus includes a ram which extends into the pocket to form a notch in the concrete therein.

3,646,768
MINE ROOF SUPPORTS
Michael E. Whitaker, Altrincham, England, assignor to Gullick Dobson Limited, Ince, Wigan, Lancaster, England
Filed Mar. 31, 1970, Ser. No. 24,171
Claims priority, application Great Britain, Apr. 8, 1969, 17,849/69
Int. Cl. E21d *15/44*
U.S. Cl. 61—45 D 8 Claims



A self-advancing mine roof support has at least two extensible hydraulic props, mounted on blocks of elastomeric material, and a prop aligning or positioning means. The latter comprises a retractable and extendable device operative between the props of the support so as to be responsive to angular movement thereof and operative or operable to give the props an initial setting attitude when the support has been relieved of the roof load. A preferred form of retractable and extendable device is a hydraulic ram having a pressure fluid cylinder attached to one prop and a piston working in said cylinder and acting substantially vertically on a foot or member projecting laterally from the other prop. A single prop aligning or positioning means may be arranged to align or position three, four or more props of a support.

3,646,769
MINE ROOF SUPPORT
Thomas Pollard, Chorley, England, assignor to Gullick Limited, Wigan, Lancashire, England
Filed Sept. 16, 1969, Ser. No. 858,379
Claims priority, application Great Britain, Oct. 1, 1968, 46,434/68
Int. Cl. E21d *15/44*
U.S. Cl. 61—45 D 2 Claims



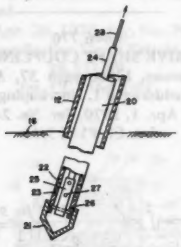
A mine roof support comprises a base structure, extensible prop means mounted on said base structure and a roof-engaging structure mounted on said prop means. The roof-engaging structure includes a canopy of U-shape or having a U-shaped part and a roof-engaging bar or member positioned or having a part positioned between or partially between the limbs of said U-shaped canopy or U-shaped part thereof. In one preferred embodiment of the invention the canopy is supported on at least one front prop and on at least one rear prop and the roof-engaging bar or member is pivotally connected to the canopy by a pivot having its axis positioned between said front and rear props.

3,646,770

METHOD AND APPARATUS FOR STABILIZING AN OFFSHORE DRILLING PLATFORM STRUCTURE

Francois Van Daalen, The Hague, Netherlands, assignor to Shell Oil Company, New York, N.Y.

Filed June 5, 1970, Ser. No. 43,875
Int. Cl. E02d *21/00, 3/10*
U.S. Cl. 61—46.5 8 Claims



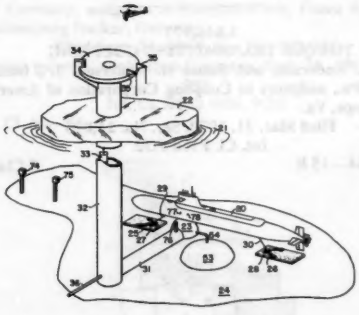
A method and apparatus for stabilizing an offshore drilling platform structure adapted to rest on the floor of a body of water by perforating at least one of the piles of the structure, thereby establishing fluid communication between the soil surrounding the pile and the interior of the pile. The fluid level in the pile is then maintained at a relatively constant low level.

3,646,771

UNDERWATER COMMUNICATION BETWEEN A VESSEL AND A STRUCTURE AND VESSEL-POSITIONING MEANS

Clarence Kirk Greene, 115 Woodside Road, Berkeley, Calif.

Filed Feb. 11, 1970, Ser. No. 10,321
Int. Cl. B63c *11/00;* B63g *8/04*
U.S. Cl. 61—69 A 24 Claims



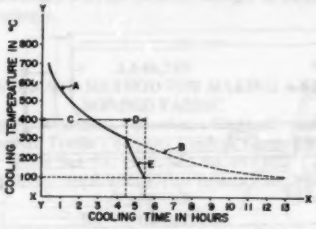
An underwater communicating connection between a marine vessel, such as a submarine, and a structure, such as a dock or underwater caisson or another marine vessel, for the passage of personnel, is formed by juxtaposing the vessel and structure to isolate a water-containing space between water-tight doors on the vessel and structure, removing water from the space, and admitting air at subaqueous pressure, whereby the vessel is forced against the structure by hydrostatic pressure; the doors are then opened. A flexible sealing member outside of the connection on the vessel or structure may engage a sealing surface on the other for additional sealing. The dock may include a tower extending to the water surface. The vessel can be positioned by anchors resting on a platform or engaged to a frame fixed to the ground.

3,646,772

METHOD OF COOLING MOLDS

Hideo Ogi; Haruo Ozaki; Masaru Mishiro; Yoshikazu Horikawa, and Shunji Mori, all of Kitakyushi, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Original application Sept. 16, 1968, Ser. No. 762,230, now Patent No. 3,548,845. Divided and this application Aug. 13, 1970, Ser. No. 63,580
Claims priority, application Japan, Sept. 22, 1967, 42/60482; Nov. 2, 1967, 42/70266
Int. Cl. F25d *31/00*
U.S. Cl. 62—62 1 Claim



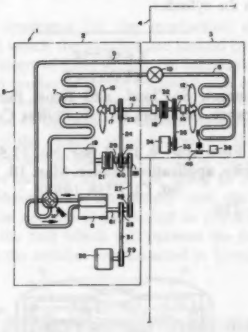
A method of water-cooling molds for casting steel ingots in which the molds are air-cooled in a cooling pit until their surface temperature is between about 500° C. and about 300° C., and then water-cooled by jetting cooling water onto the molds.

3,646,773

MOBILE REFRIGERATION SYSTEM

George L. Falk, and Daniel F. Jones, both of La Crosse, Wis., assignors to The Trane Company, La Crosse, Wis.

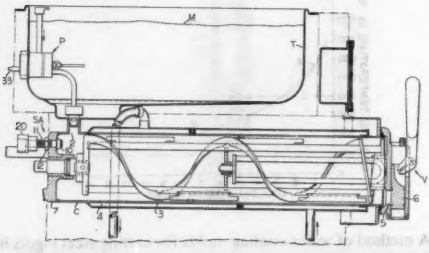
Filed Sept. 26, 1969, Ser. No. 861,318
Int. Cl. F25b *13/00*
U.S. Cl. 62—160 14 Claims



The compressor and evaporator and condenser fans of a mobile refrigeration system are driven by a continuously operating internal combustion engine. Temperature control of the refrigeration system when powered by the internal combustion engine is obtained by cycling the refrigeration system between heating and cooling cycles. A defrost cycle clutch is provided for disengaging the evaporator fan when the evaporator coil is defrosting. When an alternating current power source is available, the condenser fan and compressor may be driven by a standby electric motor, which is cycled off and on to obtain temperature control. A separate electric motor is provided to continuously drive the evaporator fan during this cycling of the standby electric motor. Means is provided to disengage the defrost clutch during operating of

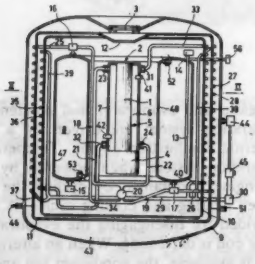
this separate electric motor. When the system is connected for standby motor operation, this separate electric motor is deenergized during the defrost cycle.

3,646,774
PRESSURE-SENSITIVE SWITCH ASSEMBLY
Bernfried M. Werner, Pompano Beach, Fla., assignor to Louis A.M. Phelan, Pompano Beach, Fla.
Filed July 29, 1970, Ser. No. 59,192
Int. Cl. F25c 7/10
U.S. Cl. 62—188 19 Claims



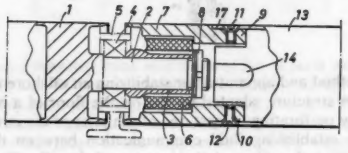
A pressure-sensitive switch assembly for measuring the pressure of material and having a measuring head which is in direct contact with the material to be measured. The head includes a flexible diaphragm to which is attached a rod that engages an electric contact switch. The assembly is an integral and self-contained, sealed unit which can be readily mounted on a supporting wall with the head on the interior of the vessel containing the material to be measured. The invention finds particular utility when used in a continuous freezer for measuring the pressure within the cylinder and then stopping the operation of the pump which pumps material into the cylinder, when a predetermined pressure is reached, thus the pump is turned off and no longer pumps material into the cylinder.

3,646,775
CRYOSTAT
Jacques Bonnerot, St-Cloud, and Henri Paradan, Meudon, both of France, assignors to U.S. Philips Corporation, New York, N.Y.
Filed Mar. 9, 1970, Ser. No. 17,560
Claims priority, application France, Mar. 10, 1969, 6906690
Int. Cl. F25b 19/00
U.S. Cl. 62—216 10 Claims



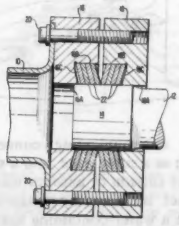
Cryostat for keeping an object at a constant low temperature, comprising an outer container which can be evacuated and in which a liquid container for cryogenic cooling liquid is disposed, the liquid container being annular and closed and substantially surrounding the object to be cooled, an inner container being present in the space between the annular liquid container and the object to be cooled, which inner container likewise substantially surrounds the object to be cooled and is in thermal contact therewith, a system of liquid ducts and a system of vapor ducts present for communicating between said containers with a blowoff valve in a vapor duct opening to the atmosphere outside the cryostat, and a control device present for controlling the pressure in at least the liquid container and the temperature in the inner container.

3,646,776
DRIVE SHAFT COUPLINGS
Lars-Goran Gustavson, Linnevagen 37, Aby, and Per-Erik Lindqvist, Stjerneldsvagen 1, Norrkoping, both of Sweden
Filed Apr. 1, 1970, Ser. No. 24,518
Int. Cl. F16d 3/16
U.S. Cl. 64—11 R 6 Claims



A device for coupling together coaxial parts or sections of a drive shaft, which parts are arranged in series, the coupling device including a sleeve containing a resilient or compressible ring. One of the shaft sections, in one embodiment of the invention, has a shaft that extends through the resilient ring. A second shaft section has a tubular end portion that fits over one end of the sleeve and is attached to the sleeve by means of screws. The resilient ring permits a slight axial movement of the sleeve when the assembly or separation of the shaft sections is required, while also taking up any small linear deviations that may arise between the two coupled shaft sections.

3,646,777
TORQUE TRANSMITTING COUPLING
James H. Anderson, and James H. Anderson, Jr., both of York, Pa., assignors to Coupling Corporation of America, New Hope, Va.
Filed Mar. 31, 1970, Ser. No. 24,095
Int. Cl. F16d 3/52
U.S. Cl. 64—15 R 5 Claims



A coupling for transmission of torque between adjacent substantially aligned shafts includes a pair of bolting flanges carried at the end of one shaft and a smooth cylindrical section at the adjacent end of the other shaft. Each bolting flange includes a bore sized to snugly surround the end of the other shaft and a counterbore of larger diameter to enclose one or more Belleville springs in the annular space between

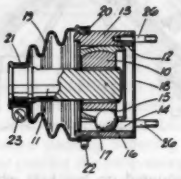
the counterbore and the adjacent end of the other shaft. Reducing the axial spacing between the flanges flexes the Belleville springs to reduce their internal diameter and increase their external diameter thus increasing the torque transmitting capability of the coupling.

3,646,778

SEALED-TYPE UNIVERSAL JOINT

Leslie George Fisher, Birmingham, England, assignor to G.K.N. Birfield Transmissions Limited, Erdington, Birmingham, England

Filed Apr. 20, 1970, Ser. No. 29,882
Claims priority, application Great Britain, Apr. 22, 1969, 20,371/69
Int. Cl. F16d *3/84*
U.S. Cl. 64—32 **3 Claims**



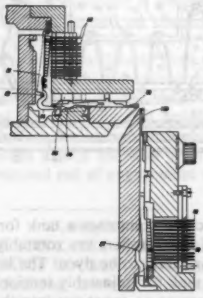
One end of the bore formed in the cylindrical outer member of a universal joint of the kind which includes torque-transmitting balls located in oppositely facing grooves in the inner and outer members is closed by a closure plate which is held in engagement with an end face of the outer member by mechanical interlocking engagement with thread formations on attachment fasteners for securing the outer member to a flange on the drive line of a vehicle.

3,646,779

KNITTING MACHINE FOR KNITTING DOUBLE FACE JACQUARD PATTERN MATERIAL

Otto Nuber, Tubingen, and Richard Norz, Rottenburg, both of Germany, assignors to Fouquet-Werk, Frauz & Planck, Rottenburg Neckar, Germany

Filed Sept. 24, 1968, Ser. No. 762,075
Claims priority, application Germany, Sept. 26, 1967, F 53 595
Int. Cl. D04b *9/08, 9/28*
U.S. Cl. 66—25 **2 Claims**



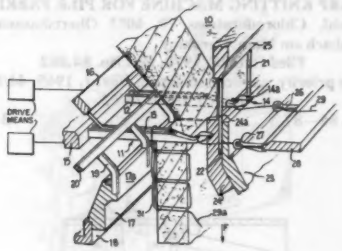
Plain single Jersey stitches are first formed, in accordance with a predetermined Jacquard pattern, with yarn of a first color with cylinder needles, then with dial needles, the yarn being supplied to respective needles alternately when the needles are in knitting position, selected needles (in accordance with the pattern) of the dial, (or cylinder) being disabled when pattern selected cylinder (or dial) needles are knitting; then the needles of the dial (or cylinder) are caused to knit with yarn of a different color, the previously knitting needles being disabled; the yarns of the first and second colors are interknitted at crossover points by transferring yarn of one color from the needle of one group (i.e., cylinder) to needles of the opposite group (i.e., dial), and vice versa. A pair of similar Jacquard pattern controllers are located, in radial alignment, in such a manner that one controller selects the cylinder needles and the other the dial needles simultaneously, the needles of the dial and cylinder being, in accordance with the pattern, brought to knitting position alternatingly.

3,646,780

APPARATUS AND METHOD FOR MAKING A STITCH-BONDED FABRIC

Arno Edgar Wildeman, Bowdon, England, assignor to Cosmopolitan Textile Company Limited, Chester, England

Filed Oct. 17, 1969, Ser. No. 867,331
Claims priority, application Great Britain, Oct. 19, 1968, 49,695/68
Int. Cl. D04b *23/10*
U.S. Cl. 66—85 A **4 Claims**



Method and apparatus for the production of a stitch-bonded fabric in which the stitches are locked by the formation of tufts or loops of fiber which are interlocked into the stitches of thread produced by the reciprocation of a series of tubular or slide needles. The invention also provides timing of the movements of the slide or tubular needles relative to the movements of the closing wires or rods for these needles and to the control of the distance moved by the needles and the closing wires or rods so that the wires or rods do not penetrate the fibrous batt completely and the degree of penetration of the needles is controlled to prevent the creation of voids in the batt which will prevent the formation of fiber loops when the needles are retracted to form stitches.

3,646,781

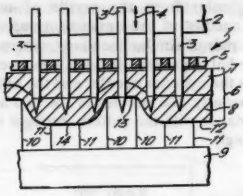
METHOD AND APPARATUS FOR PRODUCING KNITTED FLEECES ON MULTINEEDLE KNITTING MACHINES

Walter Scholtis; Siegfried Ploch; Friedrich Schattauer, all of Karl-Marx-Stadt; Martin Schonfuss, Hohenstein-E., and Horst Heilmann, Karl-Marx-Stadt, all of Germany, assignors to Forschungsinstitut fur Textiltechnologie, Karl-Marx-Stadt, Germany

Filed June 17, 1970, Ser. No. 47,493
Int. Cl. D04b *21/00*
U.S. Cl. 66—85 **22 Claims**

The present method teaches the production of knitted fleeces on multineedle knitting machines from a plurality of strand layers by entering the needles to different depths and thus into different strand layers and then forming stitches about bunches of strands seized by the needles out of dif-

ferent strand layers. The present apparatus comprises pressure means especially in the form of a plurality of pressure bars of different length or having contoured zones, which



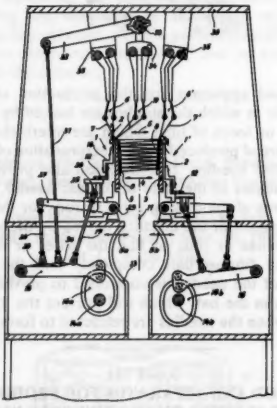
press the strand layers against the needles to different extents in different places whereby different needles enter to different depths into the strand layers.

3,646,782

WARP KNITTING MACHINE FOR PILE FABRICS

Karl Kohl, Chlorodonstrass 10, 6053 Obertshausen, near Offenbach am Main, Germany

Filed Oct. 28, 1970, Ser. No. 84,862
Claims priority, application Japan, Nov. 1, 1969, 44/88031
Int. Cl. D04b *23/02*
U.S. Cl. 66—87 3 Claims



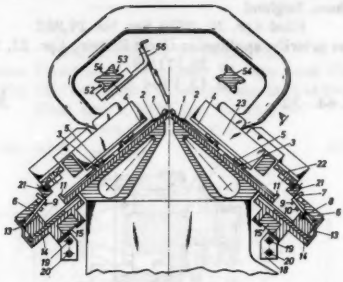
In a warp knitting machine for making pile fabrics, the two groups of first guide bars supplying yarn to knitting needles on two needle bars for respectively knitting ground fabrics on the needles perform the usual shogging motions, but do not rock, the necessary relative movement of yarn guides and knitting needles transverse to the needle bar elongation being provided by oscillation of the needle bars. One or more second guide bars arranged between the groups of first guide bar are rocked in the usual manner to connect the two ground fabrics by means of pile loops which are later cut to separate two pile fabrics.

3,646,783

KNITTING MACHINE WITH NARROWING AND WIDENING MECHANISM

Erich Krause, Bopfingen, Germany, assignor to Universal Maschinenfabrik Dr. Rudolf Schieber KG, Westhausen, Germany

Filed June 5, 1970, Ser. No. 43,781
Int. Cl. D04b *15/02*
U.S. Cl. 66—95 5 Claims



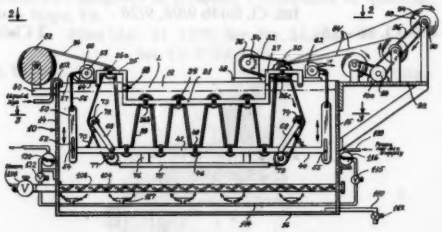
Carriers are mounted on brackets which may be shifted along each needle bed of a V-bed flat knitting machine for alignment with jacks and needles in each bed and may be moved in the direction of knitting needle elongation on the brackets by solenoids and return springs. A control arm pivotally mounted on each carrier engages an aligned jack and moves the jack toward and away from a level on which it may be engaged by cams on the knitting machine carriage, and thereby select needles whose selvage loops are to be transferred to needles of the other needle bed.

3,646,784

DYE MACHINE WITH FABRIC TENSION ADJUSTMENT

Thomas Zarrello, 80 Passaic Road, Passaic, N.J.

Filed Apr. 27, 1970, Ser. No. 31,930
Int. Cl. B05c *3/132*, *9/14*
U.S. Cl. 68—20 7 Claims



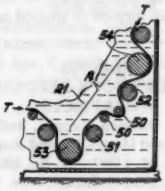
A dyeing machine comprises a tank for containing liquid dye. Upper and lower rollers are rotatably supported in the tank for carrying fabric to be dyed. The lower rollers can be adjusted in the tank for adjustably tensioning the fabric. An apertured steam pipe passes steam into the tank for heating the liquid dye and keeping it stirred. Two pumps are connected to another pipe having nozzles opening into the tank. One pump exerts suction for draining the liquid dye. The other pump feeds hot air into the tank to dry the dyed fabric. The rollers are driven by endless chains provided with laterally extending pins to engage margins of the fabric for holding it transversely taut and smooth.

3,646,785

APPARATUS FOR FINAL IMMERSION WASHING OF CONTINUOUS PIECES OF FABRIC

Roberto Arioli, 2, Via Pagoni, 82501 Saronno, Italy

Filed Aug. 10, 1970, Ser. No. 62,290
Claims priority, application Italy, Aug. 13, 1969, 20882 A/69
Int. Cl. B05c 3/132
U.S. Cl. 68—175 8 Claims



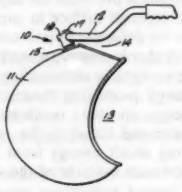
The disclosure describes an apparatus for continuous immersion washing of pieces of fabric and more particularly of knitted fabric, which comprises a plurality of washing tanks provided with a sequence of groups of rollers, each group comprising closely spaced washing, widening and feed rollers which are arranged for guiding the progressing fabric through the liquid baths within said tanks, said rollers alternatively acting on said fabric to exert a gentle transversal and longitudinal pull to ensure complete maintenance of the fabric in its ful] width while being processed.

3,646,786

EQUIPMENT ACCESSORY LOCKING APPARATUS

Paul I. Baker, 15018 Moorepark, Sherman Oaks, Calif.

Filed Mar. 6, 1970, Ser. No. 17,165
Int. Cl. E05b 73/00
U.S. Cl. 70—59 15 Claims



A releasable locking arrangement is disclosed herein having a receptacle portion mounted on the shell of a helmet which includes a central opening defined by a circular flange. A latch mechanism including a slidable shaft carrying an expandable means is utilized which is adapted to be inserted through the central opening of the receptacle and subsequently expanded into gripping and holding relationship with the flange. The latch mechanism is mounted on a part of a vehicle and includes a lock for selectively operating the latch mechanism into and out of engagement with the receptacle portion.

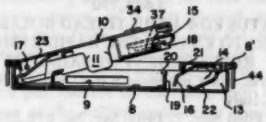
3,646,787

CLOSURE FOR SUITCASES AND THE LIKE WITH JIMMYPROOF LOCKING MECHANISM

Ernst Norrenberg-Sudhaus, Iserlohn, Germany, assignor to Heinrich Sudhaus Sohne Metallwarenfabrik, Iserlohn, Germany

Filed July 14, 1969, Ser. No. 841,362
Claims priority, application Germany, July 13, 1968, S 65 510
Int. Cl. E05b 65/48; E05c 19/08
U.S. Cl. 70—70 11 Claims

A swingable or slidable latch in a housing secured to the body of a suitcase, adapted to engage a cooperating tongue on the suitcase lid, is indexable in or spring-urged into an engaged position from which it can be released by depression of a swingable flap except when blocked by a locking



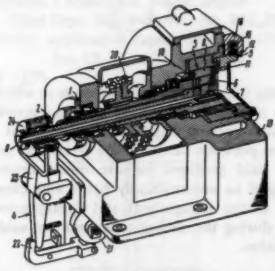
mechanism. The release may be effected through the intermediary of a resilient member which yields ineffectually in the blocked condition of the latch.

3,646,788

REDUCER HEAD OF AUTOMATIC ROTARY-SWAGING MACHINE FOR REDUCING METAL WIRE PARTS

Naum Iosifovich Beletsky, ulitsa Postysheva, 5, kv. 9, and Mikhail Lvovich Chepovetsky, Brest-Litovsky prospekt, 23, kv. 83, both of Kiev, U.S.S.R.

Filed Aug. 26, 1969, Ser. No. 853,061
Int. Cl. B21b 37/12
U.S. Cl. 72—8 3 Claims



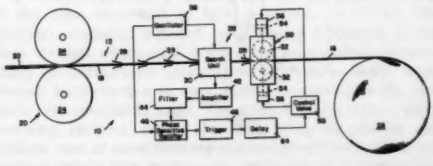
A reducer head for rotary-swaging machines, wherein an inner and an outer shaft together hold therebetween a working tool including a plurality of axially spaced ring members. Means are provided for effecting an output signal pulse upon each rotation of the head, such means including an insulating insert in one of the rings to chop a DC current fed through such ring and a current collector in sliding contact with the ring, the ring member and current collector rotating relative to each other. In this manner a direct readout may be made of the rotational speed and hence the number of swaging operations per unit time.

3,646,789

NONDESTRUCTIVE TESTING SYSTEM

Friedrich M. O. Forster, Der Schoene Weg 144, 741 Reutlingen, Germany

Filed July 22, 1969, Ser. No. 843,439
Int. Cl. B21b 37/00; B21d 43/28; B26d 5/38
U.S. Cl. 72—10 5 Claims



A system and method are disclosed for nondestructively testing materials such as wires, rods, bars, etc., while they are

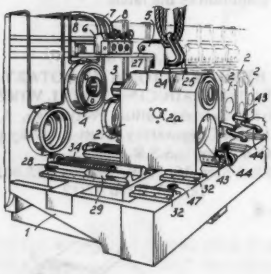
very hot (for example red hot or even white) and to mark and/or separate any defective segments of the material.

3,646,790

APPARATUS FOR A MULTIHEAD ROLLING UNIT ARRANGED TO ENABLE THE RAPID REMOVAL AND REPLACEMENT OF SAID UNIT

Ilario Properzi, c/o Continuus S.p.A. Via Cosimo del Fante 10, Milan, Italy

Filed Nov. 7, 1969, Ser. No. 870,556
Claims priority, application Italy, Nov. 21, 1968, 24035 A/68
Int. Cl. B21b *45/02, 27/06*
U.S. Cl. 72—43 **3 Claims**



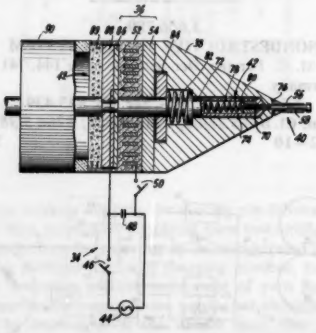
An apparatus for multihead rolling units in which each unit is removably mounted on a fixed bed and provided with a lubricating and cooling fluid distributor. Said distributor comprises two portions fast with the fixed bed and the unit, respectively. Said portions include direct operation valve means arranged to automatically open and close the fluid flow passage in the engagement and disengagement phases, respectively, during the sliding movement of said unit along respective guides.

3,646,791

METHOD AND APPARATUS FOR DEFORMING A METAL WORKPIECE, FOR UPSETTING RIVETS, AND FOR BLIND RIVETING

Basil P. Leftheris, East Northport, N.Y., assignor to Grumman Aerospace Corporation, Long Island, N.Y.

Continuation-in-part of application Ser. No. 863,045, Oct. 2, 1969. This application Nov. 6, 1970, Ser. No. 87,483
Int. Cl. B21d *26/14;* **B21j** *15/24*
U.S. Cl. 72—56 **7 Claims**



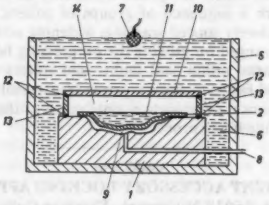
Method and apparatus for deforming a metal workpiece, for upsetting rivets, and for blind riveting which is accomplished by passing a stress wave through the metal workpiece or rivet sufficient to render it momentarily plastic and simultaneously forming it. The apparatus is basically comprised of means for generating a stress wave and a stress wave focusing device or amplifier. In operation, a workpiece is placed in a die or shaping means. The stress wave amplifier is then arranged to direct or focus the stress wave to the metal workpiece. Next, a stress wave is generated and passed through the stress wave focusing device, imparting a momentary state of plasticity to the metal workpiece. The momentarily plastic metal workpiece is then formed or shaped as desired.

3,646,792

APPARATUS FOR SHOCK-DEFORMATION OF WORKPIECES

Heinrich Hertel, and Dietrich Ruppin, both of Berlin, Germany, assignors to said Hertel, by said Ruppin

Filed Dec. 31, 1969, Ser. No. 889,587
Claims priority, application Germany, Nov. 15, 1968, P 18 09 866.3
Int. Cl. B21d *26/08*
U.S. Cl. 72—56 **24 Claims**



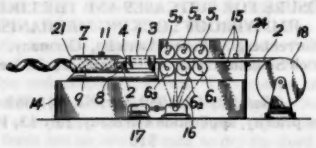
A die is located in a receptacle and has an exposed surface of predetermined contour which it is desired to impart to a workpiece. Support means is provided for supporting a workpiece proximal to the exposed surface in such position relative to the latter as to be deformable into conformance with the exposed surface. A shock energy transmitting medium is accommodated in the receptacle surrounding the die and the workpiece. Shock-energy producing means is provided for producing shock-energy in the medium. Shock-energy transfer means is interposed between the medium and the workpiece for receiving shock energy from the former and for transmitting on optimum amount of the shock energy to the latter.

3,646,793

DEVICE FOR MANUFACTURING A HELICALLY PREFORMED ELEMENT

Tatsuo Teraoka, No. 198, 3-chome, Higashi-toyonaka-cho, Toyonaka-shi, Osaka, Japan

Filed Sept. 22, 1969, Ser. No. 859,946
Claims priority, application Japan, Sept. 9, 1968, 43/64759; June 9, 1969, 44/45564
Int. Cl. B21f *35/02;* **B21b** *15/00;* **B21d** *5/08*
U.S. Cl. 72—137 **13 Claims**



The invention relates to a device for continuously manufacturing a helically preformed element of any desired length

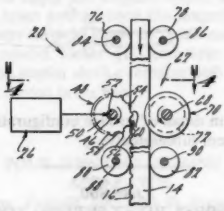
by unwinding a flat bar from a drum on which the bar is wound in coils, feeding the bar between a group of rolls and into a first die and extruding the same therefrom into a flat bar of arcuate section and forming the flat bar thus formed arcuate in section into a helix by extruding same from a second die.

3,646,794

METHOD FOR COLD-ROLLING GRATING WORKSTOCK

Paul Tishken, Birmingham, Mich., assignor to Tishken Products Co., Detroit, Mich.

Filed Apr. 8, 1969, Ser. No. 814,289
Int. Cl. B21h *8/00*
U.S. Cl. 72—187 **9 Claims**



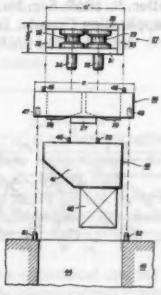
A method of forming grating material from elongated, generally flat workstock, comprising the steps of cold-forming a series of adjacently oriented notches or recessed portions along at least one edge of the workstock by peripherally engaging a rotatable externally ribbed or toothed roller element with the workstock, and thereafter passing the workstock between a plurality of spaced rollers and thereby straightening and flattening the workstock, and finally cutting the workstock into preselected lengths preparatory to assembling the same into a unitized grate structure.

3,646,795

ROLLING STAND, PARTICULARLY FOR SHAPING A CAST BAR IMMEDIATELY UPON LEAVING A CONTINUOUS CASTING PLANT, AND ROLLING MILL

Ernst Hinterholzl, Linz, Austria, assignor to Vereinigte Osterreichische Eisen-und Stahlwerke Aktiengesellschaft, Linz, Austria

Filed July 24, 1969, Ser. No. 844,322
Claims priority, application Austria, Apr. 23, 1969, A 3912/69
Int. Cl. B21b *31/08, 35/00*
U.S. Cl. 72—238 **7 Claims**



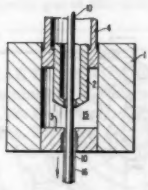
A unitized construction system for rolling stand assemblies and rolling mills, particularly intended for shaping cast bars immediately upon leaving a continuous casting plant, is proposed. In the rolling stand assemblies of the invention, which are mounted on base frames or baseplates, the rolling stand, or the rolling stand with part of its driving gear system, is vertically removably mounted on the base frame or plate, the driving gear system, or a part thereof, is detachably mounted on the base frame or plate, and the base frame or plate is vertically removably mounted on the base so that either the base frame or plate together with the driving gear system or with part thereof is removable from the base following removal of the rolling stand or of the rolling stand with part of the driving gear system, or the base frame or plate together with the rolling stand and the driving gear system is vertically removable as a compact unit. The multibar rolling mill comprises several adjacent trains of such rolling stand assemblies having base plates and base frames uniformly dimensioned with respect to the size of the rolling stands, so that they can be interconnected to structural units up to the size of the entire rolling mill.

3,646,796

A PROCESS FOR THE MANUFACTURING OF COMPOSITE METAL WIRE

Eihachiro Tanaka, Sendai-shi; Takeji Fukuda, Kanuma-shi; Kenkichi Yamaji; Yasuhiko Miyake; Hiroshi Ota, and Katsuo Kimura, Hitachi-shi, all of Japan, assignors to Hitachi Cable Limited, Chiyoda-ku, Tokyo, Japan

Filed Sept. 26, 1969, Ser. No. 861,392
Claims priority, application Japan, Sept. 28, 1968, 43/70353
Int. Cl. B21c *23/22, 25/02*
U.S. Cl. 72—258 **1 Claim**



The process for manufacturing a composite metal wire comprises extruding and coating a metal onto a metallic core wire. By this method, a traction force is added to the produced composite wire and said core wire is heated, making possible the production of a composite metal wire provided with a metal layer which can be extruded at lower temperature than the core wire and increasing the corrosion resistance of the core wire.

3,646,797

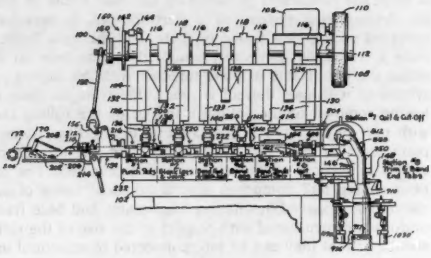
MACHINE FOR FORMING PISTON RING SPACER-EXPANDERS FROM STRIP STOCK

Roy E. Overway, Grand Haven, Mich., assignor to Sealed Power Corporation, Muskegon, Mich.

Filed May 21, 1970, Ser. No. 39,498
Int. Cl. B21d *31/00, 28/00;* **B21j** *13/10*
U.S. Cl. 72—326 **12 Claims**

A machine for making spacer-expanders for piston oil rings of the type described in U.S. Pat. No. 3,477,732. The machine comprises a punch press having a plurality of stations through which strip stock is fed progressively in accurately predetermined increments, the strip stock being worked between dies at each station to transform the strip stock into completed rings. The press includes one or more punching stations where the strip stock is pierced and blanked, one or more forming stations where the pierced and notched strip is bent to form the spring legs of the spacer-expander and then curled into a channel-shaped cross section, a coiling station where the channel-shaped stock is fashioned

into a coil, and a cutoff station where each coil is sheared from the strip to form the semifinished ring. The press also includes a special transfer apparatus for transferring the



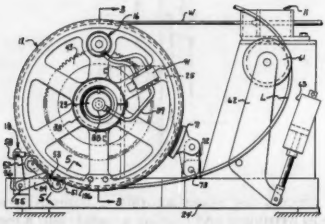
semifinished ring to a final work station wherein the end joints are trimmed and formed to final configuration, after which the finished rings are loaded automatically in stacked relation on a cylindrical mandrel.

3,646,798

WIRE DRAWING APPARATUS AND METHOD

Richard A. Alcock, Rockford, Ill., assignor to Fastener Engineers, Inc., Rockford, Ill.

Filed Feb. 9, 1970, Ser. No. 9,669
Int. Cl. B21c *1/02*
U.S. Cl. 72—289 **19 Claims**



A drum-type wire drawing apparatus and method wherein an intermediate coil of wire is wrapped in a single layer on a drawing drum assembly having inlet and outlet portions, the inlet portion is drivingly rotated with a sufficiently high torque to pull the wire through the die and wrap the drawn wire on the inlet portion, and the coil of wire is forced axially along the inlet portion onto the outlet portion where it is unwrapped from the drum assembly, and the wraps of wire on the outlet portion of the drum assembly are driven in the same direction and relative to wraps of wire on the inlet portion of the drum assembly to maintain the coil of wire tightly wrapped around the drum assembly.

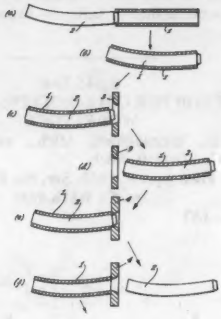
3,646,799

METHOD OF MAKING MOLDS FOR CONTINUOUS CASTING MACHINES

Adolf Kipp, and Heinz Payk, both of Osnabruck, Germany, assignors to Kabel-und Metalwerke Gutchoffnungshutte Aktiengesellschaft, Hannover, Germany

Filed Dec. 15, 1969, Ser. No. 885,126
Int. Cl. B21d *51/00*
U.S. Cl. 72—370 **5 Claims**

A method of making molds for use in continuous casting machines is disclosed, wherein a mandrel is forced into a pipe for the latter to assume overall configuration of the mandrel. The pipe is cold-worked on the mandrel to assume



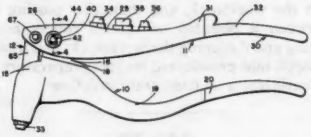
contour thereof in detail of surface configuration, the pipe is removed therefrom subsequently.

3,646,800

MANDREL RIVET-SETTING TOOL

Alan Martin, 44 Lantern Lane, Sharon, Mass.

Filed Feb. 12, 1970, Ser. No. 10,891
Int. Cl. B21d *9/05*
U.S. Cl. 72—391 **7 Claims**



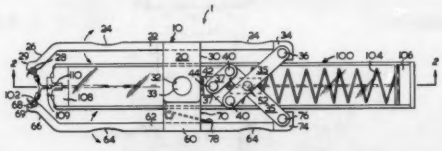
A mandrel rivet-setting tool which provides for ready adjustment in the gripping strength of the jaws and provides, if desired, means for collecting the mandrels. The tool may be used for rivets having mandrels formed over a wide range of diameters and of a range of materials.

3,646,801

STAPLER DEVICE

Italo Caroli, Westmount, Quebec, Canada, assignor to DMS Industries Limited, Lachine, Quebec, Canada

Filed Dec. 9, 1969, Ser. No. 883,383
Claims priority, application Canada, July 4, 1969, 056,155
Int. Cl. B21d *9/08*
U.S. Cl. 72—410 **3 Claims**



A stapler device is described which can house a magazine containing surgical staples or clips for closing an open wound. Preferably the magazine will be disposable. The stapler device has two complementally formed jaws which have

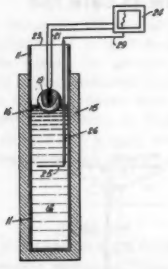
flanges thereon for enabling such jaws to be connected together so as to be pivotable about a common axis. A set of lever arms are joined at one end thereof to the two jaws, and at the other end to the magazine containing the surgical staples. These lever arms function to convert pivotal movement of the jaws about the common axis to reciprocal and preferably substantially linear movement of the magazine relative to the stapler device. This reciprocal movement of the magazine enables one surgical staple to be advanced at a time preparatory to application to the open wound. Receding of the magazine enables the staple-applying nose portion of the jaws to come substantially together to effect closing of the surgical staple as it is applied to the wound. A scissors-type spring can be provided, if desired, on the jaws to return the same to a neutral rest position, automatically. If this return spring is omitted, two positive squeezing actions are required, one to apply the surgical staple, and the other to open the jaws apart and advance the magazine forwardly to dispense the next surgical staple in readiness for application thereof to the wound. Either way, complete control over the operation of the stapler device remains with the person who is holding such device in his hand.

3,646,802

AUTOMATIC POUR-POINT-MEASURING METHOD AND APPARATUS

Jerry L. Nolting, Fishkill, and Alan D. Rouse, Pawling, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Mar. 11, 1970, Ser. No. 18,426
Int. Cl. G01n *25/02*
U.S. Cl. 73—17 13 Claims



A method and apparatus for determining pour point of a substance. The substance is first cooled below its pour point and a temperature-measuring probe is placed resting on the top surface. Then the substance is warmed from the top down while the probe temperature is continuously measured. The temperature will remain constant from the time the probe begins to sink until it is no longer free to do so. This is the pour point temperature.

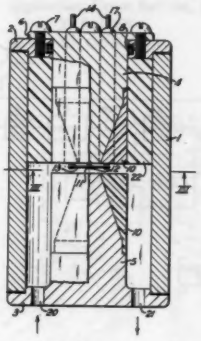
3,646,803

PARAMAGNETIC GAS-MEASURING DEVICE

Emilio G. Meyer, Milan, Italy, assignor to Mine Safety Appliances Italiana, S.p.A., Milan, Italy

Filed Mar. 6, 1970, Ser. No. 17,146
Claims priority, application Italy, Dec. 1, 1969, 25193 A/69
Int. Cl. G01n *27/18*
U.S. Cl. 73—27 A 9 Claims

The ends of a hollow cylindrical magnet are closed by closures, from which pole pieces extend toward each other with their inner ends spaced apart to form an airgap. The device is provided with an inlet and an outlet for a gaseous mixture that may contain a paramagnetic gas, such as oxygen or nitricoxide. Four electrical resistance heating elements are spaced along a substantially diametric line extending through the gap, with a pair of the elements disposed at each side of the gap. Wires lead from each element out of the magnet for connecting them in an electric circuit to heat them and the surrounding gaseous mixture. This heating, when a paramagnetic gas is present, creates a magnetic wind that moves the gaseous mixture into the gap between the two pairs of heating elements and out of it across them for removing heat from the two innermost elements and transferring it to the outermost elements. The difference in temperature between the inner and outer elements is a measure of the concentration of the paramagnetic gas in the mixture.

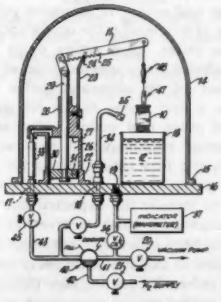


3,646,804

GROSS LEAK DETECTOR AND METHOD

Lester W. Myers, Seminole, Fla., assignor to Electronic Communications, Inc., St. Petersburg, Fla.

Filed Jan. 21, 1970, Ser. No. 4,701
Int. Cl. G01m *3/10*
U.S. Cl. 73—45.5 26 Claims

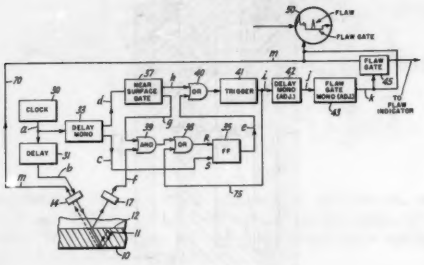


The invention contemplates observing the gross-leak condition of an article by immersing the same in a liquid inert to the material of the article. A chamber defines a limited volume surrounding the liquid and the article, and the chamber is evacuated while the article is immersed. As pressure reduces to a substantially evacuated condition, the immersed article is observed for the onset of telltale bubbles. The article is then promptly removed from the liquid while still at reduced pressure, thereby allowing the article to begin to dry immediately. The volume is then returned to ambient pressure as drying proceeds. Various specific refinements and embodiments are described.

3,646,805
ULTRASONIC FLAW DETECTION CIRCUIT

William T. Walters, Houston, Tex., assignor to AMF Incorporated

Filed Oct. 3, 1969, Ser. No. 863,599
Int. Cl. G01n 29/04
U.S. Cl. 73—67.9 8 Claims



EXEMPLARY CLAIM

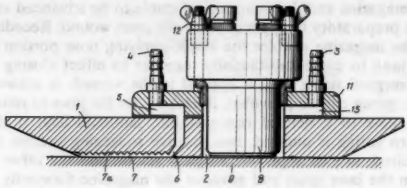
1. Ultrasonic inspection apparatus for directing ultrasonic energy into a member to be inspected and for producing output signals only during that time when true flaw signals would be expected to occur, the apparatus comprising: a source of recurring pulses, a first transducer coupled to said source of recurring pulses for producing corresponding pulses of ultrasonic energy, said transducer directing ultrasonic pulses along a single path that is oblique to a near surface of the member and also producing flaw pulses in response to received ultrasonic pulses reflected from flaws within said member, a second transducer located adjacent said near surface and disposed to receive pulses of ultrasonic energy transmitted by the first transducer along said path and reflected from the near surface, said second transducer producing near surface reflected pulses in response to the received ultrasonic pulses reflected from the near surface, means coupled to said source of recurring pulse for producing a gating pulse at a time after the occurrence of each transmitted ultrasonic pulse, each gating pulse having a time duration that includes the expected time of arrival at said second transducer of an ultrasonic pulse reflected from the near surface, a first gating means for gating each near surface reflected pulse that occurs simultaneously with a gating pulse, means responsive to near surface reflected pulses passed by the first gating means for producing corresponding flaw gating pulses, said flaw gating pulses having a time duration to include the expected time of arrival of a corresponding ultrasonic pulse received at the first transducer after having been reflected from a flaw in said member, a flaw gate coupled to said first transducer and controlled by said flaw gating pulses for passing flaw pulses from said first transducer, and output means responsive to the occurrence of flaw pulses passed by said flaw gate.

3,646,806
ULTRASONIC PROVE SYSTEM FOR FLAW-DETECTION OF MATERIAL

Yoshio Yamaguchi, and Osamu Watanabe, both of Kawasaki, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Chiyoda-Ku, Tokyo, Japan

Filed June 3, 1970, Ser. No. 43,020
Int. Cl. G01n 29/00
U.S. Cl. 73—71.5 1 Claim

An ultrasonic flaw-detecting system comprising a storing chamber for liquid formed between a shoe and cover therefor, a flaw-detecting opening and a precooling passage provided through said cover and said shoe, the shoe-side face of said precooling passage having a sawtooth configuration,

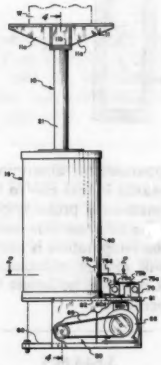


an ultrasonic flaw-detecting device positioned in said flaw-detecting opening, and inlets for supplying liquid mounted through said cover.

3,646,807
TRANSMISSIBILITY CONTROLLED VIBRATION TESTING APPARATUS AND METHOD

Robert P. Gray, Pebble Beach, and John O. Beal, Pacific Grove, both of Calif., assignors to Monterey Research Laboratory, Inc., Monterey, Calif.

Filed May 18, 1970, Ser. No. 38,162
Int. Cl. G01m 7/00
U.S. Cl. 73—71.6 16 Claims

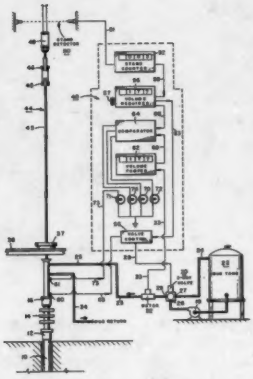


Apparatus and method for the sinusoidal vibration testing of articles in which a fluid spring of an adjustable stiffness is disposed between a test table with a test specimen thereon and a mechanical reciprocator. The stiffness of the fluid spring controls the amplitude of vibration transmitted to the test specimen. By adjusting the opposing fluid pressure on either side of a piston or by adjusting volumetric capacity of the chamber on either side of the piston, the stiffness of the fluid spring can be regulated.

3,646,808
METHOD FOR AUTOMATICALLY MONITORING AND SERVICING THE DRILLING FLUID CONDITION IN A WELL BORE

Loren W. Leonard, 8345 Triola, No. 33, Houston, Tex.

Filed Aug. 28, 1970, Ser. No. 67,706
Int. Cl. E21b 47/10
U.S. Cl. 73—155 12 Claims

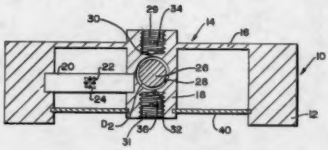


This invention automatically monitors and services the drilling fluid condition of a well bore during drill pipe withdrawal by determining the amount of fluid required to replace the amount of steel removed therefrom. The required volume of fluid is then compared with the volume of fluid pumped into the borehole during the fluid refilling operation. The result of this comparison is used, among other things, to monitor kick or loss conditions which may occur during drill pipe withdrawal.

3,646,809
ADJUSTABLE TRANSDUCER OVERLOAD STOP

Jean-Pierre A. Pugnaire, Arlington, Mass., assignor to Bytrex, Inc., Waltham, Mass.

Filed Jan. 16, 1970, Ser. No. 3,472
Int. Cl. G01l 1/26
U.S. Cl. 73—141 A 5 Claims

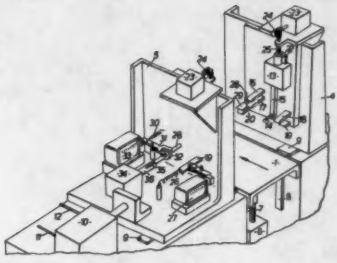


An overload stop for a transducer. A pin extends through and is spaced from an aperture in a load-deflectable element thereby limiting the travel of the deflectable element to the adjusted clearance between the pin and the sides of the aperture.

3,646,810
CANTILEVERED SPRING PRESSURE MEASUREMENT AND ADJUSTMENT

Patrick Arnold Taysom, Tonbridge, Kent; Brian Mark Lewis, Winchmore Hill, London, and Clive Francis Kittel, Pinner, Middlesex, all of England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed July 8, 1969, Ser. No. 60,782
Claims priority, application Great Britain, July 10, 1968, 32,910/68
Int. Cl. G01l 5/00
U.S. Cl. 73—161 12 Claims

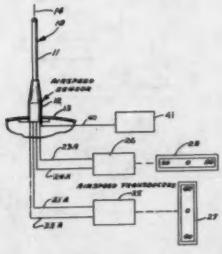


Apparatus for automatic measurement of the pressure provided by a cantilevered spring against a restraint and for the adjustment of said pressure to within desired limits. A probe is pressed against said spring lifting it from its restraint and the amount of force applied by the probe to lift the spring from its restraint is measured. If this measured force is not within predetermined limits, a bifurcated member is placed about the spring near the support from which it is cantilevered and said bifurcated member rotates so as to deform the spring in a direction such that the spring pressure will be within desired limits.

3,646,811
PRESSURE SENSOR FOR DETERMINING FLUID VELOCITIES

Richard V. DeLeo, Hopkins, and Floyd W. Hagen, Minneapolis, both of Minn., assignors to Rosemount Engineering Company, Minneapolis, Minn.

Filed Sept. 22, 1969, Ser. No. 859,804
Int. Cl. G01c 21/10
U.S. Cl. 73—182 15 Claims



A fluid-measuring system comprising an orthogonal velocity sensor utilizing fluid pressures which can be adapted for use in flight or mobile or fixed installations. The sensor comprises a probe that is internally divided into four compartments with the longitudinal axis at right angles to the plane of orthogonal measurement, and with sensing ports oriented in proper relationship to sense the orthogonal

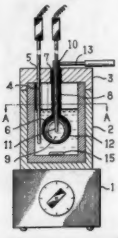
directions of velocity moving past the sensor. By measuring pressure differences between chambers on opposite sides of the probe, and using suitable pressure instrumentation the relative airspeed in the orthogonal directions can be determined.

3,646,812

APPARATUS AND METHOD FOR AUTOMATIC QUANTITATIVE ANALYSIS OF SUBSTANCES BY SLIGHT ENTHALPIMETRIC DIFFERENCE

Teruji Ishii, 26-2, Totsukamachi, Shinjuku-ku, Tokyo, Japan

Filed Aug. 8, 1969, Ser. No. 848,473
Claims priority, application Japan, Aug. 26, 1968, 43/61002
Int. Cl. G01k *17/08*
U.S. Cl. 73—190 R **9 Claims**



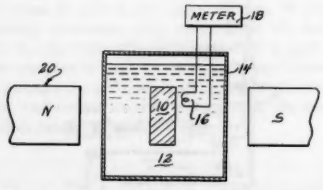
This invention relates to an apparatus and method for quantitatively analyzing a test sample based on an enthalpogram obtained by automatic recording wherein the test sample and an additive solution, such as a dissolving, diluting or reacting solution, are brought to the same temperature and then rapidly mixed to give rise to such dissolving, diluting and reacting heat respectively and the slight temperature changes be caught as said enthalpogram in an adiabatic system.

3,646,813

CRYOGENIC-SENSING DEVICE USING URANIUM MONOPHOSPHIDE-URANIUM MONOSULPHIDE

Moshe Kuznietz, Chicago; Gerard H. Lander, Clarendon Hills, both of Ill., and Yehuda Baskin, Shaker Heights, Ohio, assignors to The United States of America as represented by the United States Atomic Energy Commission

Filed Sept. 9, 1969, Ser. No. 856,428
Int. Cl. G01k *7/36*; G05d *23/20*; G01r *29/08*
U.S. Cl. 73—359 **8 Claims**



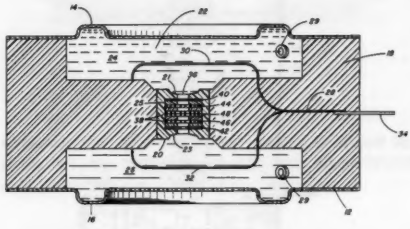
The sensor of the present invention includes a solid solution of uranium monophosphide and uranium monosulphide having a composition of $UP_{1-x}S_x$ where x=0.2 to 0.3. The uranium monophosphide-uranium monosulphide solid solution is coupled to a temperature environment and a DC magnetic field, either of which may be varied and sensed. A sense coil is mounted adjacent the uranium monophosphide-uranium monosulphide solid solution to sense the magnetization of the uranium monophosphide-uranium monosulphide solid solution relative to the values of the temperature environment and magnetic field.

3,646,814

PRESSURE DETECTOR

Walter R. Christoph, Riverdale; Jim B. McQuitty, Adelphi, and Lewis A. Vendetti, Rockville, all of Md., assignors to The United States of America as represented by the Secretary of the Navy

Filed Sept. 16, 1970, Ser. No. 72,682
Int. Cl. G01l *9/18*
U.S. Cl. 73—398 R **6 Claims**



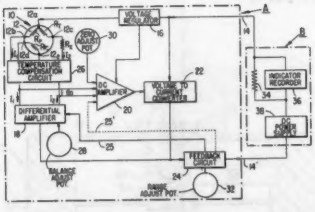
An electrochemical pressure transducer having a pressure-responsive, compliant diaphragm on either face of a cylindrical body. Pressure on either diaphragm produces movement of electrolyte fluid within the body past a series of electrodes which are connected to external electrical circuitry. As the electrolyte flows past these electrodes I_3^- ions are converted into I_1^- ions, thereby causing a current flow in the external circuitry indicative of the direction and amount of pressure. Two electrodes are provided which substantially eliminate bias currents produced by freezing of the electrolyte solution at low temperatures, and a third electrode is provided that enhances the linearity of the transducer and ensures proper indication of the direction of pressure at high flow rates.

3,646,815

SILICON PRESSURE TRANSDUCER CIRCUIT

John C. Martin, Lyndhurst, and William L. Thompson, Alliance, both of Ohio, assignors to Bailey Meter Company

Filed Mar. 26, 1970, Ser. No. 22,977
Int. Cl. G01l *9/08*
U.S. Cl. 73—398 AR **15 Claims**



A remote coupled transducer circuit having a pair of conductors extending to the remote location from which the pressure transducer circuit is energized and to which an output current signal proportional to the pressure applied to a diaphragm of semiconductor material is transmitted on the pair of conductors. The transducer circuit includes an L-type resistance bridge formed of a piezoresistor and a second resistor diffused into the diaphragm, and the piezoresistor is linearly pressure sensitive while the second resistor is pres-

sure insensitive. The resulting change of resistance in the piezoresistor due to pressure applied to the diaphragm is voltage amplified in a differential amplifier. The pressure transmitter circuit is temperature compensated against the effects of temperature variations of the resistance bridge. The output signal from the differential amplifier is used to proportionally change the output current signal. The output current signal controls a feedback transistor in the transducer circuit which rebalances the differential amplifier while sustaining the output current signal at the value proportional to the applied pressure.

3,646,816

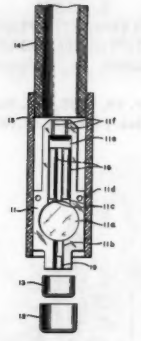
IMMERSION MOLTEN METAL SAMPLER

Richard J. Hance, Philadelphia; John R. Wiese, Dresher, both of Pa., and Harry G. Clauss, Jr., Beverly, N.J., assignors to Leeds & Northrup Company, North Wales, Pa.

Continuation-in-part of application Ser. No. 850,961, Aug. 18, 1969, now abandoned. This application July 22, 1970, Ser. No. 57,125

Int. Cl. G01n *1/12*

U.S. Cl. 73—425.4 **3 Claims**



An immersion-type molten material sampling unit comprised of a body of refractory material including an entrance passage, a first cavity for the production of a flat disclike sample, one or more additional cavities for the production of one or more pin-type samples, and an air compression chamber vented to atmosphere which facilitates rapid filling of the sample cavities. The unit is mounted in one end of a protection tube to form a low-cost expendable assembly which may be readily slipped onto the end of a piece of pipe which serves as a handle for immersing the unit in a bath of molten material. In a preferred embodiment the first cavity desirably includes a pair of chill plates to produce more rapid freezing of the disclike sample and a pair of smoother surfaces which require less clean-up prior to use of the disc for spectrographic analysis.

3,646,817

PIPETTE

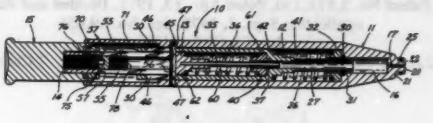
Gerald V. Hinchman; James L. Sommerville, and William D. Schmitz, all of Indianapolis, Ind., assignors to Bio-Dynamics, Inc., Indianapolis, Ind.

Continuation-in-part of application Ser. No. 770,663, Oct. 25, 1968, now abandoned. This application Sept. 30, 1969, Ser. No. 864,280

Int. Cl. G01n *1/14*; B01l *3/02*

U.S. Cl. 73—425.6 **10 Claims**

A pipette pump having two pistons therein with a smaller one of said pistons telescoped and movable within a larger of said pistons. The pistons are normally held in projected position by a pair of springs one of which is much stronger than the other so that the larger piston against which it acts is



depressed after the smaller piston. The travel of each piston is adjustable and the pistons are both depressed by depressing a cap which is fixed to the smaller piston.

3,646,818

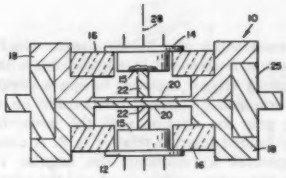
COMPENSATED OUTPUT SOLID-STATE DIFFERENTIAL ACCELEROMETER

Little J. Little, and Joe S. Hunter, both of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army

Filed Jan. 8, 1970, Ser. No. 1,481

Int. Cl. G01p *15/08*

U.S. Cl. 73—517 R **5 Claims**



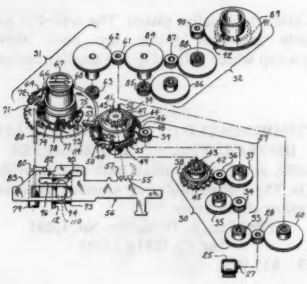
A solid-state differential accelerometer employing piezotransistors for measuring acceleration or velocity of a body along a specified axis of the accelerometer. A pair of substantially identical piezotransistors are arranged back-to-back along the axis through which tension and compression forces of acceleration are applied. A piezoelectrical emitter-base junction of each transistor is mechanically linked to a diaphragm portion of the transistor case that is normal to the acceleration axis. A force transferring bar links the outer surface of the transistor case diaphragm with a pliable surface of a nickel alloy protective housing of each transistor, the bar being aligned along the acceleration or force axis. The pliable housing surfaces are held together by a support ring and maintain the physical arrangement of the transistors back-to-back. A change in velocity along the force axis causes an opposing reaction by the pliable surfaces which convey changes through the force transferring bar to flex the piezotransistor diaphragms, stressing the emitter-base junction of each transistor.

In related electrical circuitry, the piezotransistors have collector outputs coupled to noninverting and inverting terminals of a differential amplifier. The emitters are coupled through a common current source which allows constant conduction through the piezotransistors. Acceleration forces coupled to the transistors produces a change in output voltage proportional to the specific force input over the linear range of operation. The predominant error-producing quadratic term and the bias component of the signal are canceled and the linear output is doubled without additional amplification.

3,646,819
ROTARY POWER TRANSMISSION

David G. Prosser, Mequon, Wis., assignor to Autotrol Corporation, Milwaukee, Wis.

Original application Apr. 23, 1969, Ser. No. 818,763, now Patent No. 3,574,330, dated Apr. 13, 1971. Divided and this application Sept. 2, 1970, Ser. No. 69,056
Int. Cl. G05g *21/00*
U.S. Cl. 74—3.5 7 Claims



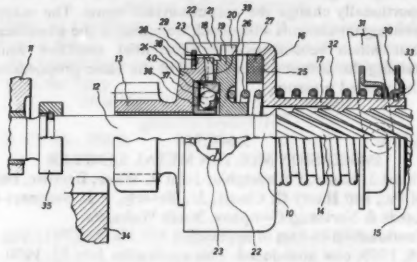
A power-transmitting gear having a space which interrupts the gear portion is disposed in engagement with a power-driven pinion. A trigger member having a peripheral gear segment is arranged in coaxial relationship on the power-transmitting gear for rotation with the power-transmitting gear and for limited rotation relative to it. A circular spring normally operates to maintain the angular relationship between the power-transmitting gear and the trigger member in a manner that the gear segment on the trigger member is positioned with respect to the gear portion of the power-transmitting member adjacent to one end of the space which separates the gear portion. The power-transmitting gear is provided with a second gear which is adapted to be meshed with a gear formed on the element to be driven. An input force applying member is movably disposed adjacent to the trigger member is operative to apply a force to the trigger member to effect its limited rotation relative to the power-transmitting gear so that the gear segment of the trigger member is moved into meshing engagement with the power-driven pinion. The trigger member being driven by the pinion effects rotation of the power-transmitting gear to mesh the gear portion thereof with the pinion. Thus, the drive from the pinion is transmitted to the power-transmitting gear that in turn operates to drive the element which it is desired to move.

3,646,820
WORM DRIVE FOR STARTER MOTORS FOR INTERNAL COMBUSTION ENGINES

Erich Vogel, Bernhausen; Gunter Ulimann, Schwieberdingen; Gerhard Pfluger, Markgroeningen, all of Germany, and Robert Bosch GmbH, Stuttgart, Germany

Filed June 19, 1970, Ser. No. 47,803
Claims priority, application Germany, June 21, 1969, P 19 31 582.3
Int. Cl. F02n *11/00*
U.S. Cl. 74—6 9 Claims

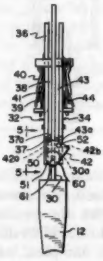
An overrunning clutch connects the start pinion to an axially movable coupling member coupled to the armature-shaft-rotated drive member by an ear that freely engages a longitudinal groove in the drive member, which has an internally threaded sleeve that meshes with the threaded portion of the armature shaft and is turned thereby.



3,646,821
AM-FM TUNER HAVING FIVE PUSHBUTTONS WITH TEN SELECTIONS

Alfred J. Clark, Palatine, Ill., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Mar. 18, 1970, Ser. No. 20,496
Int. Cl. F16h *35/18*
U.S. Cl. 74—10.33 8 Claims



A tuning mechanism for AM-FM radio receivers of the pushbutton-type wherein first and second groups of slide bar assemblies are positioned to be selectively actuated by a single group of pushbutton actuating bars. Actuation of the pushbutton actuating bar will actuate one or the other of the slide bar assemblies to change the station on the radio depending on the position of a selector means. A fingered lever is pivotally secured to the pushbutton actuating bar to have a finger portion engage a notch in one or the other of the slide bar assemblies on one side or the other side of said pushbutton actuating bar. The finger portion moves within a guide channel to prevent jamming when the locking member is in an unlocked position.

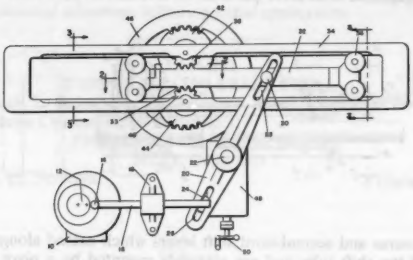
3,646,822
MECHANICAL TRANSMISSION SYSTEM

Luis Alberto Pocaterra, 845 Boylston St., Boston, Mass.

Filed Apr. 30, 1969, Ser. No. 820,443
Int. Cl. F16h *25/08*, *25/12*
U.S. Cl. 74—53 18 Claims

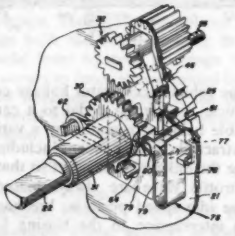
A mechanical power transmission system is provided for machines including vehicles wherein a power source, e.g., a

gear or a shaft transmits power to a receiver such as wheels by way of an oscillating transmission member. The oscillatory



path of the transmission member is varied to change the power-speed ratio applied to the receiver.

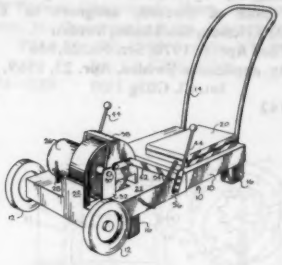
3,646,823
FINE TUNE MECHANISM
Henry H. Tap, Cary, Ill., assignor to Oak Electro/Netics Corp.
Filed Oct. 12, 1970, Ser. No. 79,963
Int. Cl. F16h *35/18*
U.S. Cl. 74—10.45 **21 Claims**



A multiple-channel VHF television tuner with memory or preset fine tuning. A channel selector shaft provides for the connection of the circuits of the desired channel and to position a fine tuning member for the selected channel at an adjustment position. The fine tuning members are rotatably mounted on the carrier fixed to the shaft and each has a gear head for engagement with a gear drive from the fine tuning control. An idler gear which interconnects the fine tuning control with the channel adjustment screws is mounted on a carrier plate which is slidable on the front plate of the tuner chassis. A spring urges the slider to bring the gears into engagement. When the channel selector shaft is turned, the slider is moved to disengage the gears and is latched in an inoperative position so that the settings of the fine tuning members are not disturbed during channel changes. The latch is released by a cam on the fine tuning control and the slider moves the idler gear into engagement for tuning adjustment.

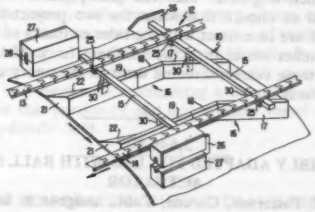
3,646,824
PNEUMATIC SPINNER FOR LAND VEHICLE TIRES
Weldon B. Dillard, Lubbock, Tex., assignor to Boyd Smith and Landon Smith, Lubbock, Tex., part interest to each
Filed Aug. 28, 1970, Ser. No. 67,680
Int. Cl. F16m *3/00*
U.S. Cl. 74—16 **5 Claims**

In spinning auto tires for the purpose of balancing same, a radial vane, expansible chamber, rotary pneumatic motor is



used.

3,646,825
STEPLESS VARIABLE TRANSMISSION
Ernst Marcus, Casilla 258, La Paz, Bolivia
Filed Nov. 10, 1970, Ser. No. 88,421
Int. Cl. F16h *21/12, 27/04, 9/00*
U.S. Cl. 74—63 **11 Claims**

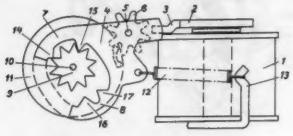


An infinitely variable transmission has a pair of track members movable along separate paths which intersect one another. Each track member has a plurality of longitudinally spaced-apart elements projecting therefrom, the elements of one track member meshing with the elements of the other track member at the region of intersection. Each of the elements of one of the track members has dimensions which continuously vary from a point adjacent one edge toward the center of that track and from the base toward a free extremity of the respective element itself, to provide a surface along that element which is angled laterally to the edge of the track and transversely to the surface of the track from which that element projects. As the other track member is put in motion along its respective path, the elements projecting therefrom mesh with the elements projecting from the first track member along the region of intersection, and as a result of the configuration of each projecting element of the first track member, the motion imparted to that member is in the direction of its respective path. The depth of engagement of the elements in the region of intersection is selectively variable to control the relative extent of motion of the first track member as its elements are encountered by elements of the other track member. The elements on the other track members are guided to encounter the elements of the first track member at a consistent preselected point for a given extent of engagement between the elements, regardless of the extent of movement of either track member. The elements mesh by undergoing sliding contact with one another in the region of the intersection, and when in such sliding contact, the motion of the engaged elements is restricted to substantially longitudinal motion along the respective paths of the track members.

3,646,826
STEPPING DEVICE

Rolf Ake Sahlgren, Tyreso, and B. Ingvar Wiljanen, Bandhagen, both of Sweden, assignors to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden

Filed Apr. 6, 1970, Ser. No. 25,944
Claims priority, application Sweden, Apr. 23, 1969, 5777/69
Int. Cl. G05g 1/00
U.S. Cl. 74—142 3 Claims

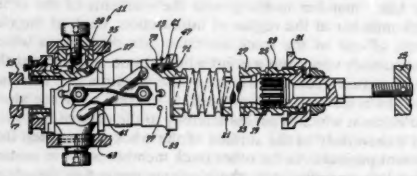


Stepping device for a comptometer provided with a ratchet wheel and a pawl. An oscillating or reciprocating movement of the pawl is changed to a unidirectional rotary movement of the ratchet wheel. The pawl is forked or bifurcated to form shanks on diametrical opposite sides of the ratchet wheel, which shanks are each provided with a projection cooperating with the teeth of the ratchet wheel. A least one of the shanks is provided with another projection situated at a circumferential distance from the projection on the same shank which is greater than the gear pitch of the ratchet wheel and so chosen that when the two projections of the said shank are in contact with the sides or flanks of two teeth of the ratchet wheel then the resultant force of the forces acting at these sides is directed through the rotary axis of the ratchet wheel.

3,646,827
ASSEMBLY ADAPTED FOR USE WITH BALL SCREW ACTUATOR

Donald S. Patterson, Corona, Calif., assignor to Sargent Industries, Inc., Los Angeles, Calif.

Filed Feb. 12, 1970, Ser. No. 10,873
Int. Cl. F16h 1/18, 55/22; F02f 5/00
U.S. Cl. 74—424.8 30 Claims



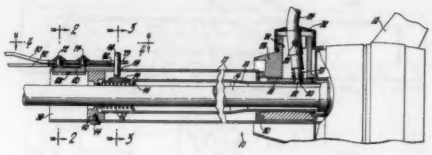
A tubular housing for receiving a screw and having a seal therein adapted to cooperate with the screw. A scraper is formed on the housing for removing foreign material from the screw. A helical rib is formed on the housing for cooperation with the groove of the screw to act as a safety feature.

3,646,828
TRANSMISSION CONTROLS

Thomas J. Milton, Bay City, and Lehman J. Connell, Frankenmuth, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 21, 1970, Ser. No. 82,746
Int. Cl. G05g 9/12
U.S. Cl. 74—484 5 Claims

Transmission control in which shaft tube is mounted in a steering column jacket for limited axial and rotary movement. There is a radially extending drive pin which is secured to the external portion of the shift tube by a tongue and groove connection with a mount. The drive pin is selectively engageable with drive portions formed in the heads of first-

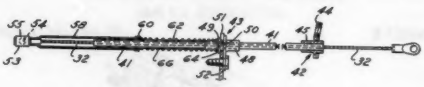


reverse and second-third shift levers which extend alongside of the shift tube and are rotatably mounted by a pivot pin radially extending from a mount secured to the jacket by tongue and groove means.

3,646,829
VEHICLE ACCELERATOR LINKAGE ASSEMBLY

Frederick Reno, Detroit, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed June 2, 1970, Ser. No. 42,644
Int. Cl. F16c 1/10
U.S. Cl. 74—513 5 Claims

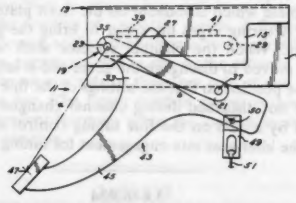


A cable-type vehicle accelerator linkage connects the conventional vehicle accelerator pedal to a carburetor throttle valve, the cable being surrounded by a variable length, expandable-contractible linkage means including a compression spring to urge the linkage parts apart so that the accelerator pedal and throttle valve are always biased in a direction toward engine idle speed position; breakage of the spring providing no interruption to the biasing force but merely multiplying the number of springs operating in series.

3,646,830
VARIABLE RATIO LEVER MECHANISM

Larry R. Shrock, Westland, Mich., assignor to Larry R. Schrock, Dearborn, Mich.

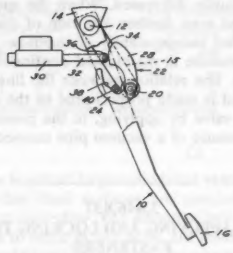
Filed June 1, 1970, Ser. No. 42,408
Int. Cl. G05g 1/14
U.S. Cl. 74—516 5 Claims



A variable ratio lever mechanism adaptable for use as a parking brake control pedal assembly. The mechanism includes a control lever pivotally connected to a support structure by a pair of links. The pivotal connections between the lever and first link and between the support structure and the second link have a common first axis; the pivotal connections

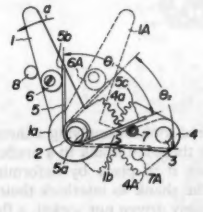
between the lever and the second link and between the support structure and the first link have a common second axis. The mechanism provides a lesser mechanical advantage during initial application of the parking brake and a greater mechanical advantage following initial application.

3,646,831
VARIABLE RATIO BRAKE PEDAL
Francis L. Janosi, Dearborn Heights, Mich., assignor to Ford Motor Company, Dearborn, Mich.
Filed July 6, 1970, Ser. No. 52,234
Int. Cl. G05g 1/04
U.S. Cl. 74—518 3 Claims



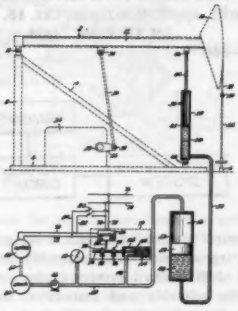
A variable ratio brake pedal assembly including a foot-operated pedal lever, a brake-applying means and an intermediate lever interposed between the pedal lever and the brake-applying device. The intermediate lever has cam surfaces that engage both the brake-applying device and the foot-operated pedal lever whereby a change in mechanical advantage ratio occurs as force is transmitted from the pedal lever through the intermediate lever to the brake-applying device when the pedal lever pivots and the intermediate lever is angularly displaced.

3,646,832
CORDED-SPRING ENERGY CONTROL DEVICE
Ban Hirafuji, Yokohama, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan
Filed Apr. 23, 1970, Ser. No. 31,328
Claims priority, application Japan, May 31, 1969, 44/42788
Int. Cl. G05g 1/04
U.S. Cl. 74—519 4 Claims



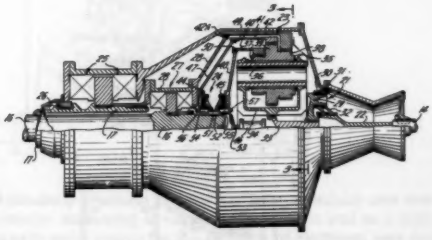
A device for automatically controlling the elastic energy of a coiled spring when an operation lever pivotally supported by a shaft and normally urged in one direction by one end of the coiled spring is caused to move in the other direction against the biasing force of the spring. The device comprises means to relieve the other end of the coiled spring when the operation lever is moved in the other direction as aforementioned so as to thereby restrict an increase in the elastic energy of the coiled spring.

3,646,833
COUNTERBALANCING SYSTEM FOR OILFIELD PUMP JACKS
Earnest B. Watson, Osawatomie, Kans., assignor to Raymond S. Bowers, Jr., Osawatomie, Kans., a part interest
Filed Aug. 28, 1969, Ser. No. 871,463
Int. Cl. G05g 1/24
U.S. Cl. 74—589 3 Claims



A counterbalancing system for an oilfield pump jack including a walking beam reciprocable by power means to operate the pump, said counterbalancing system comprising a hydraulic ram interconnected between said walking beam and a fixed support, said ram being hydraulically interconnected with an accumulator vessel of larger diameter than said ram and means for maintaining a counterbalancing air pressure in that portion of said accumulator vessel not occupied by hydraulic field.

3,646,834
COUNTERROTATING OUTPUT TRANSMISSION
Charles S. Davis, New York, N.Y., assignor to Curtiss-Wright Corporation
Filed Oct. 28, 1970, Ser. No. 84,565
Int. Cl. F16h 37/06, 1/28
U.S. Cl. 74—674 11 Claims



The counterrotating output transmission comprises a planetary gear assembly connected to be rotatively driven by a source of rotary power and having three different sized output ring gears. The intermediate-sized ring gear is connected to rotate a first output shaft while the smallest and the largest ring gears are alternatively connected to rotate a second output shaft in a direction counter to the first output shaft. A clutch assembly is provided to coact with the smallest and largest ring gears to alternately connect the ring gears to the second output shaft and thereby shift the reaction load of the planetary gear assembly radially and cause reverse rotation

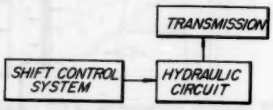
of ring gears and, hence, change the direction of rotation of each of the first and second counterrotating output shafts.

3,646,835

SHIFT CONTROL SYSTEM FOR VEHICLE AUTOMATIC TRANSMISSION

Shin Ito; Seitoku Kubo, and Takakazu Mori, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota-shi, Japan

Filed May 8, 1970, Ser. No. 35,787
Claims priority, application Japan, Oct. 18, 1969, 44/83412
Int. Cl. B60k *21/08*
U.S. Cl. 74—860 17 Claims



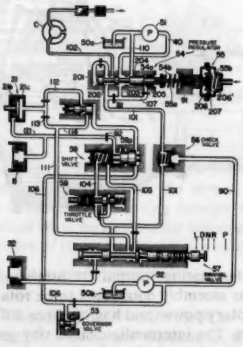
A shift control system for a vehicle automatic transmission including a transmission gear assembly and gear engaging means. The shift control system comprises both electrical and hydraulic controls and associated shift lever means, whereby the gear changing operation of the transmission is automatically controlled by the electrical control system according to the driving conditions thus providing a highly variable ratio transmission, while provision is made for the semiautomatic control of the transmission by means of the hydraulic circuit. The important features of both automatic and semiautomatic transmissions are thus embodied in one system.

3,646,836

HYDRAULIC CONTROL SYSTEM FOR AUTOMATIC TRANSMISSIONS

Seitoku Kubo; Kiyoshi Ohnuma, and Koichiro Hirosawa, all of Aichi-ken, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota-cho, Toyoda-shi, Aichi-ken, Japan

Filed June 2, 1970, Ser. No. 42,844
Claims priority, application Japan, June 5, 1969, 44/44182
Int. Cl. B60k *21/00*
U.S. Cl. 74—864 10 Claims



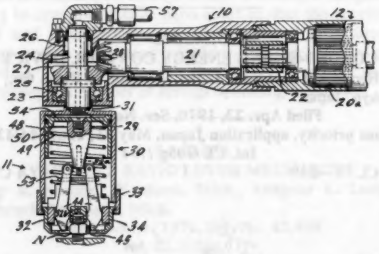
A hydraulic control system is provided for a fluid-type automatic transmission of the type including a fluid torque converter and speed change gearing coupled to the converter and operated by hydraulic servomechanisms. The system includes a pressure regulator valve which regulates the pressure of the hydraulic fluid, supplied from a pump or pumps driven by the engine, to a predetermined line pressure applied to the hydraulic servomechanisms. When the engine is operating at a low speed, the line pressure is sharply increased using only the hydraulic pressure fluid from a front oil pump driven by the engine. When the engine speed is increased slightly, the line pressure is maintained at a constant high value by controlling discharge of the hydraulic fluid under pressure to correspond with the supply of hydraulic fluid under pressure through a flow restriction. When the speed of the engine is increased further, the rate of fluid flow through the flow restriction becomes increasingly less than the rate of fluid discharged, so that a hydraulic pressure differential is provided between two regulator valve chambers interconnected by the flow restriction. As a result, the line pressure is gradually decreased. When the speed of the engine is increased even further, the rate of discharge of the fluid is controlled independently of the flow restriction, so that the line pressure is maintained continuously at a constant low value. The relation between the line pressure and the engine speed is made proportional to the opening of an engine throttle valve by applying, to the pressure regulator, the negative pressure of a vacuum pipe connected to the engine.

3,646,837

TOOL FOR APPLYING AND LOCKING THREADED FASTENERS

Harold C. Reynolds, Athens, Pa., assignor to Cooper Industries, Inc., Houston, Tex.

Filed May 18, 1970, Ser. No. 38,168
Int. Cl. B25b *27/00*
U.S. Cl. 81—10 28 Claims



A fluid-powered tool for applying a threaded fastener on a correspondingly threaded shank to a predetermined tightness and then locking it in place by deforming or swaging the fastener upon the shank to interlock their threads. The tool includes a rotatably driven nut socket, a fluid motor for driving the socket, and a torque responsive shutoff device effective to stop rotation of the socket when a predetermined torque has been reached. The locking or deforming mechanism includes a plurality of reciprocating jaws positioned radially adjacent the nut socket which jaws are movable in a remote position external of the socket to a deforming position extending into the socket. A control means is provided which will cause the jaws to automatically move to their deforming position after the torque-responsive shutoff device has stopped rotation of the nut and to return the jaws to their remote position so that the tool may be removed.

3,646,838

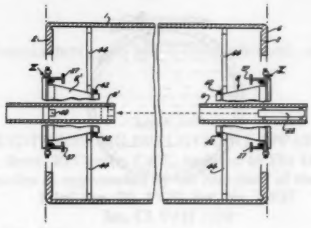
METHOD OF MACHINING CYLINDRICAL SHELLS

Axel Brix Andersen, Larchmont, N.Y., assignor to F. L. Smidth & Co., New York, N.Y.

Original application Sept. 25, 1967, Ser. No. 670,243, now Patent No. 3,550,488. Divided and this application Apr. 17, 1970, Ser. No. 33,136

Int. Cl. B23b *1/00*

U.S. Cl. 82—1 C 3 Claims



The faces or heads of large cylindrical vessels or shells are machined so that their surfaces are precisely parallel and have a common centerline. For example, ball mill or rod mill shells too large to place in any lathe, are machined to receive the conventional trunnions at their opposite ends. The operation is accomplished with great precision, the faces being machined parallel and any shoulders being machined on a common centerline, i.e., the axis of the shell. Two machining mechanisms are temporarily mounted within and one at each end of the shell. The tool shafts of these mechanisms are hollow and are aligned by the use of a laser or other suitable radiation beam.

3,646,839

MACHINE TOOL CONTROL SYSTEMS

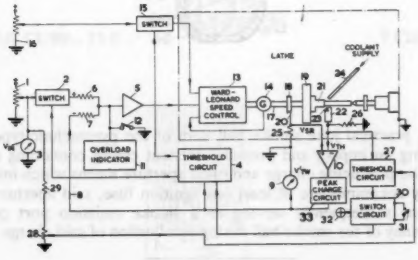
Norman Frederick Shillam, Farnborough, England, assignor to National Research Development Corporation, London, England

Filed May 7, 1970, Ser. No. 35,520

Claims priority, application Great Britain, May 12, 1969, 23,998/69

Int. Cl. B23b *25/06*

U.S. Cl. 82—1 6 Claims



A control system for a metal cutting machine tool in which a thermally generated e.m.f. developed between a cutting edge and a workpiece is used to control the cutting speed within desired limits. The system comprises a servo having a speed control loop which responds to the thermal e.m.f. and is arranged to adjust the cutting speed continuously so as to bring the thermal e.m.f. to within predetermined limits.

3,646,840

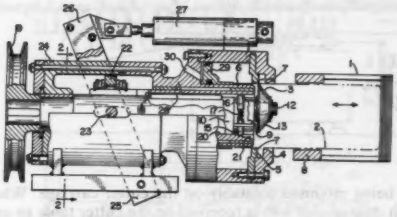
TRIMMING HEAD FOR METAL CANS

John S. Bozek, Chicago, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Filed Oct. 27, 1969, Ser. No. 869,694

Int. Cl. B23b *3/04, 5/14, 1/00*

U.S. Cl. 82—82 8 Claims



A trimming head for metal cans having a cutter rotating against a stationary cutter ring. The can end to be trimmed is fitted inside the stationary exterior cutting ring. As the interior cutter rotates, it cuts the can end off to leave the can at a uniform length. A knockout ring ejects the scrap, and the trimming head is ready for the insertion of another untrimmed can end.

3,646,841

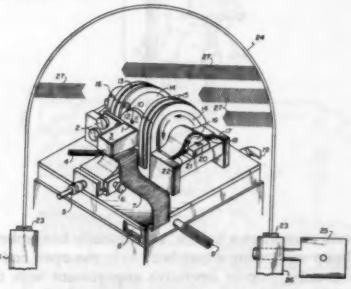
APPARATUS USING ULTRASHARP DIAMOND EDGE FOR ULTRATHIN SECTIONING

Humberto Fernandez-Moran Villalobos, 5807 Dorchester Ave., Chicago, Ill.

Continuation-in-part of application Ser. No. 466,877, June 22, 1965, now Patent No. 3,447,366. This application June 2, 1969, Ser. No. 829,267

Int. Cl. B26d *4/44*

U.S. Cl. 83—171 10 Claims



Ultrasharp diamond edge is used for molecular and submolecular sectioning at ultralow temperature and as a high-intensity point source for the emission of electrons, ions and neutrons.

3,646,842

APPARATUS FOR THE REMOVAL OF CLAY WEB WASTES IN A CLAY-SHAPING MACHINE

Dieter Keck, Westphalia, Germany, assignor to C. Keller Und Co., Laggenbeck, Germany

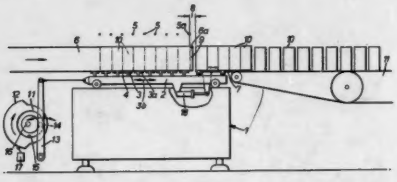
Filed Nov. 3, 1969, Ser. No. 873,545

Int. Cl. B28b *11/14*

U.S. Cl. 83—104 1 Claim

A cutter for producing green shapes includes a carriage movable reciprocally in the length direction of a green clay

web, the carriage mounting a divided cutting table, the dividing gaps of which correspond to one dimension of the shapes to be formed. Cutter wires pass through the green clay web as the carriage is moved forwardly, a mounting wheel of the



wires being mounted rotatably on the cutter carriage. When a fresh strip of clay web is received on the cutter table an end portion at the leading edge overhangs the leading edge of the table and is cut off by the leading cutter wire, thus ensuring that at each operation the shapes have identical dimensions.

3,646,843

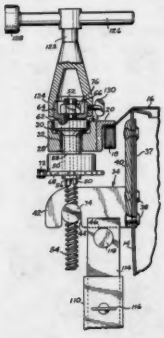
KETTLEDRUM

Jesse N. Kregal, 6244 Washington Ct., Lake Grove, Oreg.

Filed Dec. 12, 1969, Ser. No. 884,455

Int. Cl. G10d *13/04*, *13/02*

U.S. Cl. 84—419 **16 Claims**



A kettledrum comprises a hollow, substantially hemispherical body, a hoop supporting a taut head over the open end of the body, a counterhoop in operative engagement with the hoop, and head tensioning means interengaging the body and counterhoop. The tensioning means comprise a plurality of pairs of spaced thrust bearings and brackets extending radially from the body at peripheral intervals. First clamp means associated with each pair and flexible drive means interconnecting all of the pairs adjust the tension of the head uniformly across its surface. Second clamp means associated with each first clamp means selectively adjusts the tension of the head in the area immediately adjacent. The drum is supported on the brackets, certain of which are freely supported interconnecting all of the pairs adjust the tension of the head uniformly across its surface. Second clamp means associated with each first clamp means selectively adjusts the tension of the head in the area immediately adjacent. The drum is supported on the brackets, certain of which are freely supported on associated leg members. The resulting drum suspension imparts a clear, unmuffled tone to the drum.

3,646,844

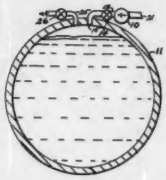
METHOD AND APPARATUS FOR FILLING CONTAINERS WITH EXPLOSIVE SLURRY

Robert B. Clay, Bountiful, Utah, assignor to Intermountain Research & Engineering Co., Inc.

Filed Jan. 14, 1970, Ser. No. 2,785

Int. Cl. F42b *33/02*; B67d *3/00*

U.S. Cl. 86—20 **8 Claims**



Blasting slurries which contain aeration in the form of finely dispersed bubbles of gas are filled into bombs and other containers under pressure, using a fluid force pump and a check valve arrangement, including a special gas vent, to insure complete filling for storage, compensating for shrinkage of the slurry due to cooling. The gas vent is designed to release air or other gas in the container, to facilitate filling, but its outlet openings are closed by check valves or are so fine that slurry cannot escape through them.

3,646,845

METHOD OF MAKING PRACTICAL JOKE SMOKE-EMITTING ARTICLES

Bernard J. Semel, 1441 Okie St., N. E., Washington, D.C.

Continuation-in-part of application Ser. No. 685,194, Nov. 22, 1967. This application July 17, 1969, Ser. No. 842,566

Int. Cl. C06d *1/08*; F42b *3/02*

U.S. Cl. 86—20 A **7 Claims**

A practical joke smoke ball item of the pyrotechnic-type having an impact and pressure-resistant casing containing a smoke-producing charge and open aperture means which initially accommodate at least one ignition fuse, said aperture means subsequently serving as a smoke emission port or chimney of the smoke ball during combustion of said charge.

3,646,846

FIBROUS GRAPHITE PACKING

George E. Houghton, Palmyra, and Sudhakar G. Dixit, Rochester, both of N.Y.

Filed Jan. 19, 1970, Ser. No. 3,743

Int. Cl. F16j *15/22*; B65d *53/00*; D04c *1/02*

U.S. Cl. 87—1 **4 Claims**

A packing material comprising graphite strands of fibrous material, said strands and interstices therebetween, being

thoroughly impregnated with impregnating material comprising a fluorocarbon resin and a solid lubricant, such as graphite.

3,646,847

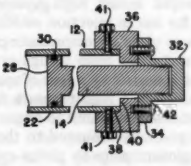
SLUG-THROWING DEPLOYMENT APPARATUS

Gene R. Drew, El Centro, Calif., assignor to The United States of America as represented by the Secretary of the Navy

Filed Jan. 26, 1970, Ser. No. 5,827

Int. Cl. F41f *1/00*

U.S. Cl. 89—1 G **4 Claims**



A general purpose deployment gun utilizing a projectable slug for propelling a load. The load is attached to the slug by a movable connection which enables the slug to be propelled by a symmetrical application of forces without the need for reversing its course thereby providing a smooth, stabilized flight.

3,646,848

METHODS OF MACHINING COMBS FOR MUSICAL MECHANISMS

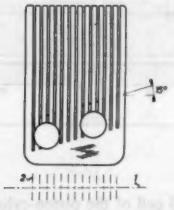
Emile Matthey, Vuiteboeuf, Switzerland, assignor to Matthey S.A., Vuiteboeuf, Switzerland

Filed June 12, 1970, Ser. No. 45,726

Claims priority, application Switzerland, June 16, 1969, 9137/69

Int. Cl. B23c *3/00*

U.S. Cl. 90—11 C **7 Claims**



A comb blank is given two inclinations relative to the rotational axis of a spindle carrying a plurality of spaced rotatable tools of equal diameter. The comb blank is then passed relative to the tools when rotating so that a plurality of parallel tongues are formed in the comb blank from one end of the comb blank towards the opposite end. The relative inclinations are so arranged that a line joining the roots of the tongues where the tongues join the remainder of the comb blank forms a predetermined angle with the one end of the comb blank.

3,646,849

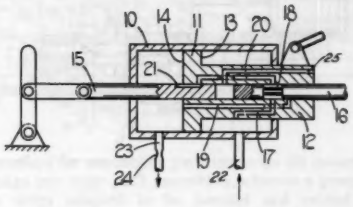
SERVOMECHANISM

Trevor Stanley Smith, Birmingham, England, assignor to Joseph Lucas (Industries) Limited, Birmingham, England

Filed Feb. 10, 1970, Ser. No. 10,132

Int. Cl. F15b *9/10, 12/17*

U.S. Cl. 91—52 **5 Claims**



The invention relates to a fluid-pressure operated servomechanism and includes a piston and an associated control member which combine to form a followup servo. There is additionally provided a further control member, whereby movement of the piston to follow the first control member is possible only if the second control member is within prescribed limits of position relative to the piston.

3,646,850

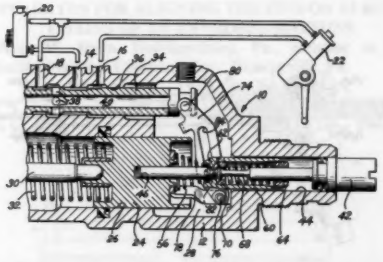
DETENT MECHANISM FOR BRAKE BOOSTER

Peter W. Boyer, South Bend, Ind., assignor to The Bendix Corporation

Filed Mar. 16, 1970, Ser. No. 19,579

Int. Cl. F15b *13/10*

U.S. Cl. 91—391 **7 Claims**



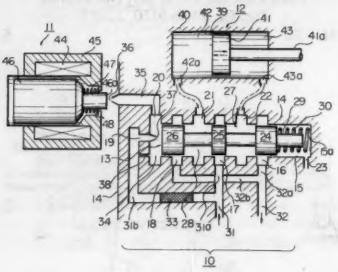
A hydraulic brake booster is disclosed which includes a housing, a piston slidable in the housing and operatively connected to a master cylinder for actuating the latter, and valve means for admitting pressurized fluid into the housing for shifting the piston. A sleeve is slidably mounted on an operator-operated control rod that is slidably mounted in the housing, ans a pair of levers pivotally interconnect the piston, the sleeve, and the valve mechanism. A releasable coupling device joins the sleeve to the rod for movement therewith when the valve mechanism is functioning normally, but permits the rod to move relative to the sleeve when a malfunction prevents movement of the valve means.

3,646,851

HYDRAULIC SHIFT VALVE

Yoichi Mohri, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed May 6, 1970, Ser. No. 35,101
Claims priority, application Japan, May 16, 1969, 44/37596
Int. Cl. F15b *13/043*; F16k *31/02*
U.S. Cl. 91—459 1 Claim



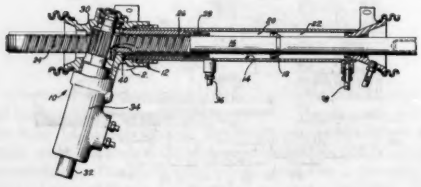
A hydraulic shift valve for shifting relative positions of an actuating element such as for gear elements of an automotive transmission system, which shift valve includes a spool valve unit having a spool valve element moved by a fluid pressure in a hydraulic fluid circuit, a solenoid device to control the movement of the spool valve element in accordance with electric signals that it receives, and a servo unit connected to and controlled by the valve unit thereby to shift positions of the actuating element in relation to the relative positions of the spool valve element.

3,646,852

DETENT MECHANISM FOR RACK AND PINION POWER STEERING

Martin A. Shields, South Bend, Ind., assignor to The Bendix Corporation

Filed Aug. 17, 1970, Ser. No. 64,537
Int. Cl. F15b *11/08*, *13/04*; F01b *7/20*
U.S. Cl. 91—467 9 Claims



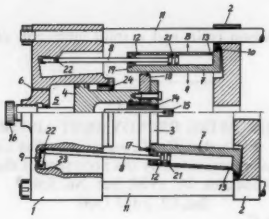
A rack and pinion power-steering unit is disclosed which includes a detent mechanism that couples the sleeve used in units of this type to the rack when the vehicle wheels are turned in one direction, but permits relative movement between the rack and the sleeve when the vehicle wheels are turned in the opposite direction. The detent includes a spherical force transmitting element which is normally carried in a recess in the housing, but which is urged into a position interconnecting the sleeve and the rack when the wheels of the vehicle are turned in the one direction. When the vehicle wheels are turned in the opposite direction, the force-transmitting element couples the sleeve to the housing.

3,646,853

CLOSURE APPARATUS

Peter Florjancic, St. Martinstr. 12, Garmisch-Partenkirchen, Germany

Filed Apr. 27, 1970, Ser. No. 32,165
Claims priority, application Austria, Apr. 28, 1969, A 4080/69
U.S. Cl. 92—76 8 Claims



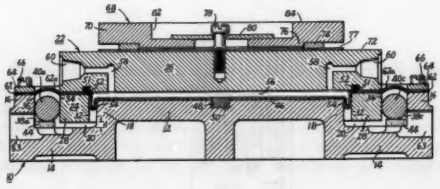
A reciprocating rapid acting high-pressure closure apparatus is described for use in injection molding applications and the like. A closure plate is reciprocatingly mounted for movement towards and away from a high-pressure working region to a frame and is moved by a pair of spaced piston and cylinders located alongside a high-pressure force-producing device. A pair of braces are mounted to respective piston and cylinders which are pivotally mounted to the closure plate. The advance of the closure plate by piston-cylinder action is accompanied by a corresponding swivel action of the braces which are swiveled into positive engagement between the closure plate and the force-producing device when the closure plate has neared the end of its advancing stroke at the working region. At the working region the high-pressure force is actuated to produce a high force through the swiveled brace onto the closure plate.

3,646,854

LOAD CELL WITH HIGH CROSS LOADING CAPACITY

Chester D. Bradley, Darien, and Malcolm C. Tate, Stamford, both of Conn., assignors to The A. H. Emery Company, New Canaan, Conn.

Filed Mar. 18, 1970, Ser. No. 20,665
Int. Cl. F16j *3/00*
U.S. Cl. 92—98 11 Claims



An hydraulic load cell of the piston-cylinder type capable of withstanding high levels of cross loading. The piston and cylinder carrying members are assembled about roller bearings for free relative axial and angular telescopic movement. The cell is also provided with a flexible diaphragm which is extended over the roller bearings and secured to form an integral dust jacket, and with a sliding load head structure to absorb lateral thrust.

3,646,855

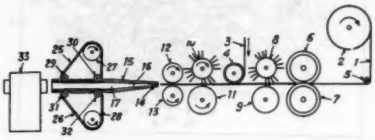
METHOD AND APPARATUS FOR PRODUCING A TOBACCO FILTER ROD OR CORD FROM A WEB OF FIBROUS MATERIAL

Paul Adolf Muller, Herrliberg, Switzerland, assignor to Celfil Company Establishment, Vaduz, Liechtenstein

Original application Jan. 22, 1957, Ser. No. 635,470, now Patent No. 2,916,039, dated Dec. 8, 1959, and a continuation-in-part of 502,016, Apr. 18, 1955, now Patent No. 2,995,481, dated Aug. 8, 1961, and a continuation-in-part of 504,647, Apr. 28, 1955, now Patent No. 3,161,557, dated Aug. 8, 1961; said 635,470, , and 504,647, , which is a continuation-in-part of application Ser. No. 502,016, , which is a continuation-in-part of application Ser. No. 447,478, Aug. 3, 1954, now Patent No. 2,847,086, dated Aug. 12, 1958. Divided and this application Sept. 1, 1959, Ser. No. 841,918

Int. Cl. B31d

U.S. Cl. 93—1 C 9 Claims



Apparatus and process for treating paper strip material to render it particularly adapted to be gathered and enclosed in a wrapper to make a filter cord subdividable into efficient cigarette filters. The paper is first moistened to prevent undue tearing in a longitudinal grooving and lateral stretching treatment which loosens and exposes fibers by passage through the nip between heated meshing rollers of rigid material having alternating circumferential grooves and ridges. After being grooved and stretched the paper is dried to set the grooves, and optionally flattened somewhat by a knurling operation. The grooving and stretching may be carried out by successive sets of rollers wherein the following sets may be operated at a higher peripheral speed to stretch the paper longitudinally.

3,646,856

METHOD OF MAKING A VALVE BAG

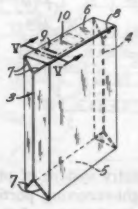
John Worndl, Brampton, Ontario, Canada, assignor to Canadian Industries Limited, Montreal, Quebec, Canada

Filed Jan. 26, 1970, Ser. No. 5,567

Claims priority, application Great Britain, Feb. 17, 1969, 8,507/69

Int. Cl. B31b *49/04*

U.S. Cl. 93—35 R 6 Claims



A side weld bag having a patch valve located at one end of the bag. Preferably the bag ends are gusseted. The bag is manufactured by attaching a valve patch so as to cover an opening in the free border of a folded length of film. The edges of the folded length are then sealed together to form a bag having a valve in one end. The bag can be manufactured using a modification of a known bagmaking machine.

3,646,857

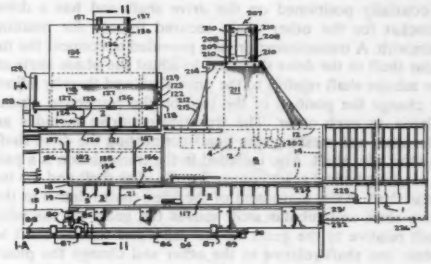
INNER PACK ASSEMBLY MACHINE

Thomas Larry McDougal, Route #5, Fairmont, W. Va.

Filed Oct. 24, 1969, Ser. No. 869,287

Int. Cl. B31b *1/00*

U.S. Cl. 93—37 R 40 Claims



A method for assembling partition strips slit inwardly from one edge into inner pack assemblies, wherein a group of partition strips adapted to lie parallel and extend in one direction in the pack assembly are gathered in parallel, vertically spaced, longitudinally staggered relation and at an incline to the horizontal with their edges at the slits spread vertically, and another group of partition strips adapted to lie parallel and extend at an angle to the direction of the first group in the pack assembly are gathered in parallel, vertically spaced, longitudinally staggered relation and horizontal at a position confronting the first group, and the two groups are brought together in interlocking relation. Machines for carrying out the method are disclosed with magazines for holding supplies of the partition strips of the two groups, and having means to eject strips from the magazines, transport them to the opposed, confronting position, and leave them in the arrangements set out in the method. Additional means moves one group toward the other to assemble the inner pack. Several embodiments of the invention are disclosed, illustrating various arrangements of magazines and various means for operating the gathering mechanisms.

3,646,858

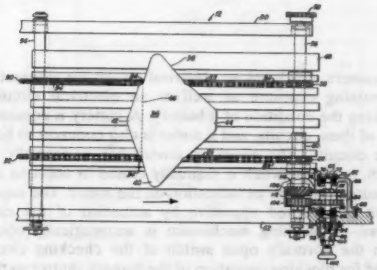
APPARATUS FOR ALIGNING THE PINS ON ALIGNER CHAINS OF AN ENVELOPE MACHINE

Herbert W. Helm, Hollidaysburg, Pa., assignor to F. L. Smithe Machine Company, Inc., Duncanville, Pa.

Filed Aug. 17, 1970, Ser. No. 64,181

Int. Cl. B31b *21/00*

U.S. Cl. 93—62 10 Claims



Envelope blank timing and aligning apparatus includes a support table for the envelope blanks with a pair of spaced parallel endless chains. The chains are positioned slightly

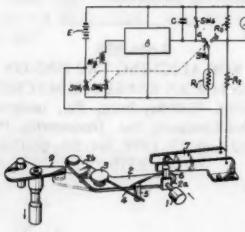
below the upper surface of the table with pin members extending upwardly therefrom. The pin members engage edge portions of the envelope blank and convey the envelope blank along the table in timed and aligned relation for feeding into the other envelope-forming elements of the machine. A drive for the chains includes a drive shaft connected to a drive gear. A drive sprocket for one of the chains is secured to the drive shaft for rotation therewith. A tubular drive shaft is coaxially positioned on the drive shaft and has a drive sprocket for the other chain secured thereto for rotation therewith. A transmission drive is provided to connect the tubular shaft to the drive shaft and to adjust the phase angle of the tubular shaft relative to the drive shaft and thereby adjust or change the position of the pins on the respective chains relative to each other. The transmission drive includes an idler shaft and meshing spur gears connecting the drive shaft and the idler shaft. Also included in the transmission is a pair of meshing helical gears connecting the idler shaft and the tubular shaft. Axial movement of the idler shaft relative to the drive shaft and tubular shaft moves the gears on the idler shaft relative to the gears on the drive and tubular shaft to rotate one shaft relative to the other and change the phase angle between the drive shaft and the tubular shaft. The adjustment of the phase angle between the respective shafts may be accomplished while the shafts are rotating to thereby adjust the relative position of the aligner pins while the envelope machine is running.

3,646,859

CAMERA PROVIDED WITH AUTOMATIC EXPOSURE AND BATTERY-CHECKING CIRCUITS

Yukio Umemura, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo-to, Japan

Filed Jan. 20, 1971, Ser. No. 107,884
Claims priority, application Japan, Jan. 27, 1970, 45/7842
Int. Cl. G03b *17/18, 7/08*
U.S. Cl. 95—10 CT **6 Claims**



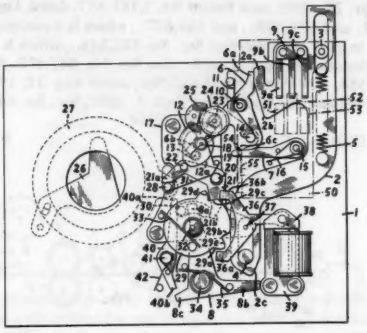
A camera which has an electrical circuit for automatically determining exposure as well as an electrical circuit for checking the condition of a battery. A battery is common on both of these circuits, and a meter is also common to both of these circuits. The checking circuit has a normally open switch, and this switch is manually closed in order to check the battery through an indication on the meter. The exposure circuit is rendered operative by actuation of the camera shutter. A blocking mechanism is automatically operated when the normally open switch of the checking circuit is closed for blocking operation of the camera shutter so that in this way operation of the meter in connection with battery-checking operations cannot interfere with the operation thereof in connection with exposure operations.

3,646,860

CAMERA WITH AUTOMATICALLY CHARGED SHUTTER

Kiyoshi Kitai, Tokyo, Japan, assignor to Kabushiki Kaisha Hattori Tokeiten, Tokyo, Japan

Filed June 18, 1969, Ser. No. 834,457
Claims priority, application Japan, June 19, 1968, 43/42168
Int. Cl. G03b *7/08, 9/08*
U.S. Cl. 95—10 CT **3 Claims**



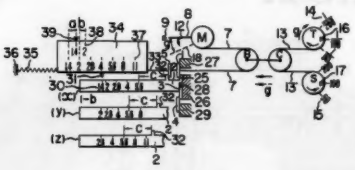
A camera with an electronic shutter of simplified construction without a cocking or charging member. The shutter initiates an exposure approximately at the end of the depression stroke of a release member and has means including a delay circuit having a photoelectric element sensing the brightness and an electromagnet for automatically controlling exposure aperture opening and exposure time in accordance with the brightness of a subject or field being photographed. The shutter has mechanism for charging it automatically when the release member is restored to a rest position by a resilient member.

3,646,861

EXPOSURE PHOTOMETRY SYSTEM FOR PHOTOGRAPHIC CAMERA

Tatsuo Fujii, Tokyo, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Dec. 23, 1969, Ser. No. 887,559
Claims priority, application Japan, Dec. 27, 1968, 43/95777
Int. Cl. G03b *7/04*
U.S. Cl. 95—10 C **4 Claims**



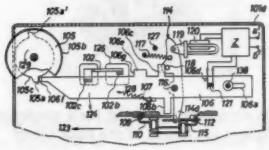
Exposure photometry system of photographic equipment provided with a light-receiving portion of exposure meter passing through at least a part of the photographic optical system. When obtaining an exposure for an aperture smaller than a specified aperture of the photographic optical system, the light is measured in like manner to full-open photometry by letting the light passing through said specified aperture be accepted by the light-receiving portion. On the other hand, when obtaining an exposure for an aperture larger than said specified aperture, the light passing through said larger aper-

ture is accepted by the light-receiving portion of the exposure meter.

3,646,862
PHOTOGRAPHIC APPARATUS WITH DOUBLE EXPOSURE PREVENTING MEANS

Reinhard Von Sybel, Krailling; Dieter Engelsmann, and Gunter Fauth, both of Unterhaching, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 4, 1970, Ser. No. 16,307
Claims priority, application Germany, Mar. 7, 1969, P 19 11 774.9
Int. Cl. G03b 9/68, 9/62, 17/42
U.S. Cl. 95—31 AC **24 Claims**

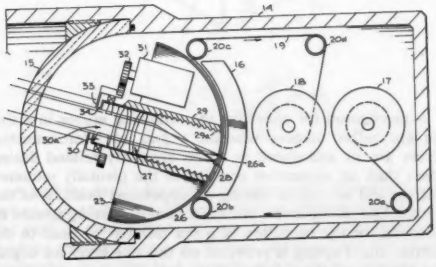


A still camera wherein a spring-biased bolt is free to move in response to actuation of the camera release to assume a position in which it prevents renewed actuation of the release. The bolt is moved from such position in response to transport of the film by the length of a frame to thereby stress a spring which propels it in response to renewed actuation of the release whereby an impeller of the bolt opens the leading blade of the shutter which thereupon remains in open position at least until the release reassumes its idle position. The trailing shutter blade is permitted to close and to thus complete the exposure with a delay which is determined by a retard mechanism or by an electrical circuit as a function of scene brightness.

3,646,863
ADAPTIVE UNDERWATER CAMERA

John S. Winslow, Altadena, Calif., assignor to Tetra Tech Inc., Pasadena, Calif.

Filed June 25, 1969, Ser. No. 836,329
Int. Cl. G03b 17/08
U.S. Cl. 95—11 **6 Claims**

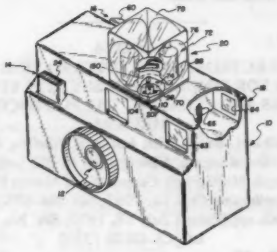


The present invention is an underwater camera which, because of its narrow field of view, looks only at the illuminated portion of an object. The camera includes a servosystem by means of which the camera is continuously positioned to follow the illuminated portion of the object.

3,646,864
FLASHLAMP-SENSING AND PERCUSSIVE-FIRING MECHANISM FOR PHOTOGRAPHIC APPARATUS

William T. Hochreiter, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 14, 1969, Ser. No. 850,007
Int. Cl. G03b 9/70, 13/02, 17/20
U.S. Cl. 95—11.5 R **7 Claims**

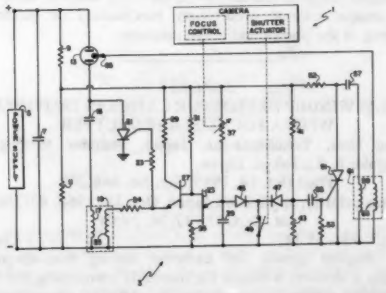


An improved photographic mechanism for mechanically sensing and firing a percussive flashlamp device is actuatable and resetable by the camera body release or shutter actuator and without requiring additional setting force upon film winding. The flashlamp device includes a preenergized striker, and the mechanism includes a sensing and actuating member movable into a first distinct position in engagement with the striker to sense the condition of the flashlamp. To fire the lamp, the sensing and actuating member is rapidly moved to a second and striker-dislodging position by a hammer or driver. Movement of the sensing and actuating member to such first and second positions is effected by depression of the camera body release or shutter actuator, and return movement thereof effects both retraction of the member and resetting or positioning of the hammer or driver. The mechanism also may be provided with one or more lamps or other indicating means for presenting an output or signal indicative of the sensed condition of the flashlamp or position of the preenergized striker.

3,646,865
ELECTRONIC FLASHLAMP CONTROL NETWORK

Conrad H. Biber, Needham, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Nov. 7, 1969, Ser. No. 874,826
Int. Cl. G03b 9/70
U.S. Cl. 95—11.5 R **13 Claims**



A circuit is provided for automatically inducing an actinic discharge in a gas discharge photoflashlamp in response to

the actuation of a camera shutter. Means are provided for electronically controlling the duration of the actinic discharge as a function of camera focus setting.

Basically, the duration control means comprises a capacitor in the discharge path of a photoflashlamp and shunted by an electronic switch. The switch is normally closed so as to short circuit the capacitor. A timing circuit opens the switch after a time interval determined by the camera focus setting and causes the lamp to quickly charge the capacitor in its discharge path so as to terminate the actinic discharge emanating from the lamp.

3,646,866

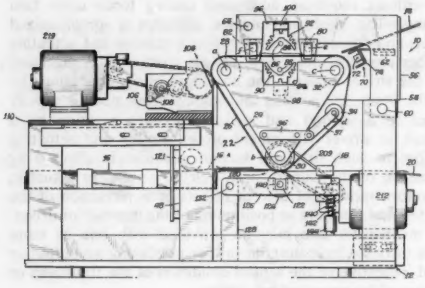
PHOTOELECTROSTATIC COPIER HAVING A SINGLE STATION FOR SIMULTANEOUSLY APPLYING TONER PARTICLES AND CLEANING THE PHOTOCONDUCTIVE MEDIUM

Evan S. Baltazzi, Brookfield; Loren E. Shelffo, Palatine, and Michael Moduthagam, Chicago, all of Ill., assignors to Addressograph-Multigraph Corporation, Mount Prospect, Ill.

Original application Oct. 16, 1967, Ser. No. 675,463. Divided and this application July 18, 1970, Ser. No. 61,005

Int. Cl. G03b *15/00*

U.S. Cl. 355—15 **19 Claims**



A photoelectrostatic copying apparatus equipped with a reusable continuous belt coated with an organic photoconductive medium adapted to move in an orbital path. A series of processing stations are located adjacent the path of movement of the belt so that, in sequence, it moves past charging, exposing, developing and transfer stations producing a copy or multiple copies on plain paper. The organic photoconductive medium is reusable. It is ready immediately after a developed image is transferred to the copy sheet to receive a new image without preliminary mechanical or electrical cleaning of the photoconductive medium.

3,646,867

FILM WINDUP DEVICE FOR CAMERAS PROVIDED WITH A FOCAL PLANE SHUTTER

Shigeo Ono, Yokohama-shi, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

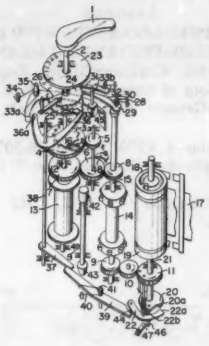
Filed Oct. 14, 1969, Ser. No. 866,280

Claims priority, application Japan, Oct. 18, 1968, 43/75625

Int. Cl. G03b *17/36, 19/04*

U.S. Cl. 95—31 AC **7 Claims**

A windup device for cameras having film-advancing means, a shutter, a clutch for normally connecting the film-advancing means to the shutter in operative engagement, a film counter and a back cover, the device being characterized by a mechanism for returning the film counter to its initial position while simultaneously disengaging the clutch upon opening the back cover and a mechanism for retaining



the clutch in its disengaged position for a predetermined film advance subsequent to closure of the back cover.

3,646,868

MECHANISM FOR OPERATING THE REFLECTING MIRROR IN A SINGLE-LENS REFLEX CAMERA

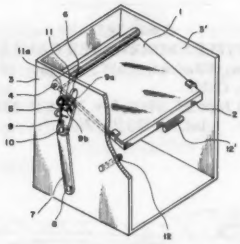
Minoru Sekida, Sakai-shi, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed July 25, 1969, Ser. No. 844,749

Claims priority, application Japan, Aug. 1, 1968, 43/65993

Int. Cl. G03b *19/12*

U.S. Cl. 95—42 **2 Claims**

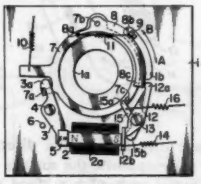


A mechanism for operating the reflecting mirror in a single-lens reflex camera wherein a pair of interconnected levers are so articulated as to be angularly related during other than an uppermost position of the pivotally mounted mirror, and be coaxial during an uppermost position of the mirror. One of the levers has a slot therein opening toward its free end for the reception of a pin member secured to the mirror, and a spring is provided on this one lever for urging the pin toward the bottom of the slot. The levers are so arranged that the pin is slightly spaced from the bottom of the slot to thereby increase the spring tension in the lowermost position of the mirror resting against a stop means, whereby the frame is moved upwardly as the residual tension of said spring is lessened and permits the pin to be moved closer toward the slot bottom until it makes contact therewith in the uppermost position.

3,646,869
ELECTRONIC SHUTTER FOR PHOTOGRAPHIC CAMERAS

Kiyoyuki Arai, Gyoda, Japan, assignor to Kabushiki Kaisha Koparu

Filed Feb. 3, 1970, Ser. No. 8,248
Claims priority, application Japan, Feb. 10, 1969, 44/9922; Apr. 30, 1969, 44/40262
Int. Cl. G03b 9/58
U.S. Cl. 95—53 EB 8 Claims

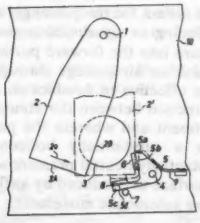


A shuttering opening control lever has a permanent magnet which is attracted to an electromagnet when the electromagnet is deenergized. A shutter closing control member is attracted to the electromagnet when the electromagnet is energized, and the repelling force between the electromagnet and the permanent magnet actuates the shutter opening control lever to effect opening of the shutter. Upon deenergization of the electromagnet the shutter closing control lever, which has until then been attracted to the electromagnet, moves away from the latter and effects closing of the shutter.

3,646,870
DEVICE FOR BRAKING OF SHUTTER BLADES OR THE LIKE

Boris Koleff, Munich, and Erich Nagel, Anzing, both of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed May 13, 9170, Ser. No. 36,884
Claims priority, application Germany, May 17, 1969, P 19 25 312.4
Int. Cl. G03 9/10
U.S. Cl. 95—59 14 Claims

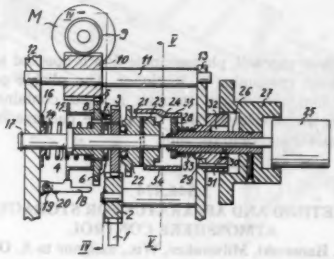


A braking device for shutter blades or the like which comprises a pivotable actuating member normally extending into the path of movement of the blade and serving to displace a braking member which is thereby urged against the blade, preferably in a direction at right angles to the direction of movement of the blade, to produce a controlled braking action. The braking member is integral with or is coupled to the actuating member by a torsion spring or the like. Elastic cushions are provided on the actuating and braking members in such positions that the cushion of the actuating member is struck by the moving blade and the cushion of the braking member strikes against the blade in response to resulting displacement of the actuating member.

3,646,871
DIAPHRAGM ADJUSTMENT DEVICE FOR A MOTION PICTURE CAMERA

Gilbert Ramet, Cuarny, Switzerland, assignor to Paillard S.A., Sainte-Croix, Vaud, Switzerland

Filed Mar. 2, 1970, Ser. No. 15,621
Claims priority, application Switzerland, Mar. 13, 1969, 3794/69
Int. Cl. G03b 9/07
U.S. Cl. 95—64 B 5 Claims

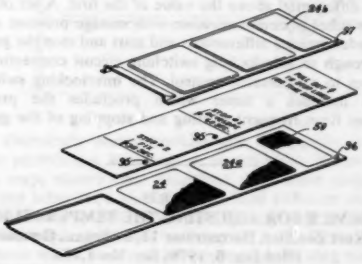


An automatic control and a manual regulator for the diaphragm are combined with preselection apparatus so that after manual focusing adjustment at maximum aperture, the latter is restored to automatic control on actuating the filming trigger. The automatic control comprises an electric motor actuating the diaphragm through a coupling and a friction clutch with a locking member. The coupling has two parts held in a certain position by a spring and two stops, and is rotatably mounted on a spring-urged sliding shaft fixed to a control button and bearing a cogwheel which meshes with a pinion for automatic control and disengages for manual control. Under or over exposure is indicated by lamps controlled by a contactor responsive to the direction of rotation of the motor.

3,646,872
PHOTOGRAPHIC FILM-DEVELOPING APPARATUS

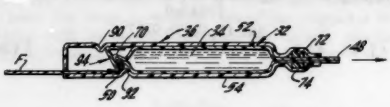
James F. Bowlby, 124 Demarest Road, Bloomingdale, N.J.

Filed Sept. 17, 1968, Ser. No. 760,231
Int. Cl. G03d 5/00
U.S. Cl. 95—89 8 Claims



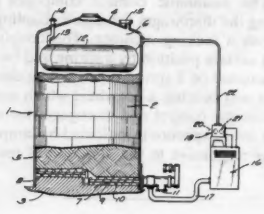
A disposable photographic processor having a pair of elongated plates which are sealed to each other along their longitudinal edges to thereby form the inlet and outlet for the processor. A cup for containing a processing solution is formed in one of the plates. A pull strip is positioned between the plates and has an attaching device thereon for drawing an exposed film through the processor.

3,646,873
SINGLE USE FILM DEVELOPER
James F. G. Bowlby, 124 Demarest Road, Bloomingdale, N.J.
Filed Apr. 8, 1969, Ser. No. 814,243
Int. Cl. G03d 5/02
U.S. Cl. 95—89 R 3 Claims



A length of exposed, photographic film is coupled to a pliable package containing a developer. The pliable package and the film are drawn through a rigid container that discharges the developer from the pliable package into the rigid container and onto the film.

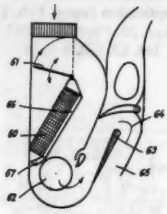
3,646,874
METHOD AND APPAPATUS FOR STORAGE ATMOSPHERE CONTROL
Frank D. Hamerski, Milwaukee, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis.
Filed Nov. 3, 1969, Ser. No. 873,375
Int. Cl. E04h 7/22
U.S. Cl. 98—1.5 8 Claims



A storage unit having a gas generator connected to a generally sealed storage structure for supplying a controlled atmosphere gas to the structure. The generator is controlled by initiating generator operation when the storage structure pressure declines to a predetermined differential with the ambient, and by terminating generator operation when pressure in the storage structure builds to a second predetermined differential above the value of the first. A set of pressure switches in communication with storage pressure detect the predetermined differentials and start and stop the generator through an interlocking switching circuit connecting the switches to a generator control. The interlocking switching circuit includes a timer which precludes the pressure switches from frequent starting and stopping of the generator.

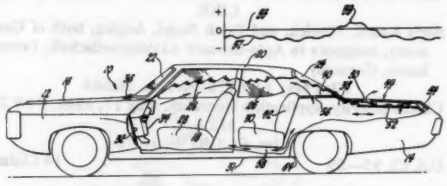
3,646,875
DEVICE FOR ADJUSTING THE TEMPERATURE
Kurt Zenkner, Hertzstrasse 12, Ettlingen, Germany
Filed Jan. 8, 1970, Ser. No. 1,454
Claims priority, application Germany, Aug. 14, 1969, P 19 41 356.0
Int. Cl. B60h 1/24
U.S. Cl. 98—2.08 36 Claims

An arrangement for regulating the temperature inside a vehicle includes a casing containing a heat exchanger and a transverse-flow blower for moving air through the heat exchanger. The blower includes an impeller and the casing has a guide wall opposite the impeller which starts at a point close to the impeller and extends in a spiral of increasing radius through an angle of about 180° around the impeller axis and has a continuation tangent to its end remote from the impeller. A wedge-shaped vortex-forming tongue has a surface on its suction side which faces the impeller and forms



therewith a passage diverging in the direction of impeller rotation. A guide plate opposite the surface of the tongue on the suction side forms with such surface a channel which converges from the discharge side towards the suction side and runs approximately tangential to the periphery of the impeller.

3,646,876
FLOW THRU BODY VENTILATION
Ward J. Atkinson, Northville, and Edward N. Cole, Bloomfield Hills, both of Mich., assignors to General Motors Corporation, Detroit, Mich.
Filed Apr. 15, 1970, Ser. No. 28,641
Int. Cl. B60h 1/24
U.S. Cl. 98—2.11 3 Claims



A ventilation system for the passenger compartment of an automobile including an air admission means for introducing air under pressure into the forward portion of the passenger compartment and an air passage through the automobile's exterior surface effective to conduct an uninhibited flow of air in either direction between the atmosphere and the passenger compartment and wherein the passage opens to the atmosphere in a substantially horizontal rear deck lid between a substantially neutral pressure area on the automobile's exterior surface as produced by airflow over the exterior surface during automobile movement.

3,646,877
CLOSURE OPERATOR
David H. Ellis, West Chicago, Ill., assignor to Rixson Inc., Franklin Park, Ill.
Filed Dec. 22, 1969, Ser. No. 886,916
Int. Cl. F24f 13/00
U.S. Cl. 98—110 9 Claims

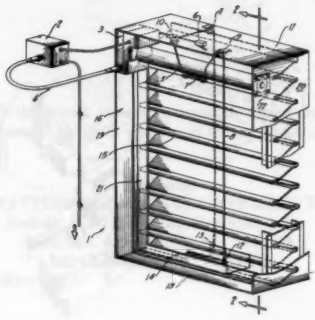
A closure operator to effect remote, fail-safe opening and closing of a closure, particularly a multifold or interlocking slat curtain damper.

A frame or shell envelopes the damper curtain which is capable of opening and closing an air passage defined by the frame or shell. A rotatable drum is positioned within the

frame or shell adjacent the curtain when it is folded so that the drum will not obstruct airflow through the damper when the damper is opened. A cable couples the drum and the curtain; and the curtain is opened in response to the winding of the cable about the drum in response to drum rotation.

A drum drive mechanism is axially aligned relative the axis of the drum so that both components extend completely across the frame or shell immediately adjacent the folded curtain.

Upon occurrence of (1) a manual switch operation to effect damper closure, (2) a power failure, (3) circuit malfunctioning, or (4) the detection of an undesired condition such



as smoke or fire, the drum drive clutch is disengaged. When the clutch is disengaged, the drum unwinds to lower the curtain and close the damper.

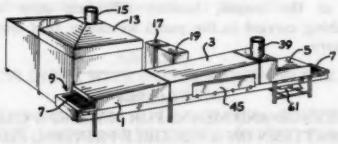
In an alternative drum embodiment, the drum includes a cable takeup spool and a drum body of relatively greater mass than the spool. A drawn cup roller clutch couples the spool to the drum body. This clutch is engaged when the curtain is folded to open the damper; and the clutch is disengaged when the curtain is released to close the damper. With this drum arrangement the forces of drum momentum acting upon the cable (and tending to rewind the cable in the opposite direction) are substantially minimized when the curtain is released for damper closure.

3,646,878

APPARATUS FOR BARBECUING FOOD

Ernest Keller, Chicago, Ill., assignor to Louis Jutzi, Palos Park, Ill.

Filed May 11, 1970, Ser. No. 36,137
Int. Cl. A47j *37/00*
U.S. Cl. 99—339 **4 Claims**



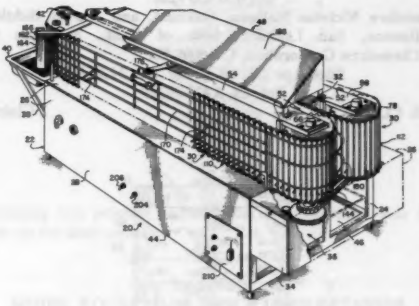
Chicken halves are placed on a continuously moving horizontal conveyor and conveyed first through a charcoal searing station that sears the bottom side of the product, then through a microwave section where the cooking takes place in an atmosphere of charcoal smoke from the charcoal fire, then through an infrared heating section for forming a crust and browning the top surface thereof.

3,646,879

AUTOMATIC BROILING APPARATUS

Einar H. Palmason, and Harry R. Stevens, both of Fort Lauderdale, Fla., assignors to Parkson Corporation, Fort Lauderdale, Fla.

Filed Mar. 21, 1969, Ser. No. 809,148
Int. Cl. A47j *37/00*
U.S. Cl. 99—339 **19 Claims**



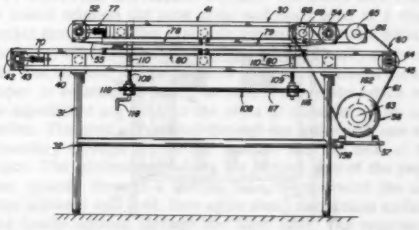
An automatic apparatus for broiling comestibles having a guiding and conveying mechanism for transporting comestibles in a vertical position through spaced infrared broiling elements where the comestibles are continuously cooked from both sides simultaneously as they travel through the elements and after broiling are continuously removed from the guiding and conveying means.

3,646,880

COOKING GRILL

James D. Norris, Chicago, Ill., assignor to Thermal Process Engineering Company, Chicago, Ill.

Filed Aug. 21, 1970, Ser. No. 65,917
Int. Cl. A47j *37/00*
U.S. Cl. 99—349 **10 Claims**



An electrically heated cooking grill for rapidly cooking cheese sandwiches, hamburgers, french toast, bacon, pancakes, crepe suzette (thin pancakes), pizza crust, scrambled eggs, and other food products. The food products are conveyed between a pair of endless heating belts which are heated by upper and lower heating units in the form of heating platens which have variable temperature heating zones so arranged that the cooking temperature is varied as the food product moves through the variable temperature heating zones. The upper heating unit includes front and rear upper heating platens which are vertically adjustable with the upper heating belt relative to the lower heating unit or platens and heating belt to provide for food products of varying sizes and thicknesses and the front and rear upper heating platens may be tilted relative to the horizontal so that as the food product moves progressively through the grill from front to rear and

shrinks in size due to the cooking operation the front and rear upper heating platens and the upper heating belt will be disposed in the most advantageous heating position relative to the lower heating belt and heating unit or platens. The endless heating belts are designed to be nonsticky and to provide for rapid heat transfer from the heating units or platens to the food products being cooked and for long wear life.

3,646,881

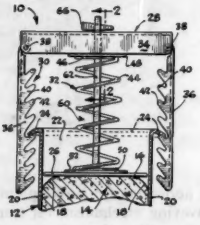
MOLD COVER

Theodore Nicholas Rathjen, Oakland, and Harold Biddick Hanson, San Leandro, both of Calif., assignors to Chemetron Corporation, Chicago, Ill.

Filed Apr. 24, 1970, Ser. No. 31,668

Int. Cl. A47j *27/20*

U.S. Cl. 99—351 **2 Claims**



In a mold cover for use in combination with an elongated open-ended mold, such as may be used in molding meat loaves and other food products, means are provided for maintaining a movable pressure plate in predetermined transverse relation to the sides of the mold as the plate is biased for movement longitudinally into the mold.

3,646,882

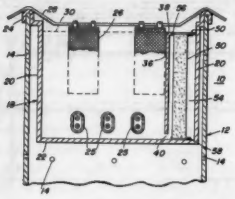
FILTER FOR DEEP FRYER

Richard T. Keating, 4301 West Madison St., Chicago, Ill.

Filed May 28, 1969, Ser. No. 828,672

Int. Cl. A47j *37/12*

U.S. Cl. 99—408 **13 Claims**



A multilayered filter element for deep fryers characterized by both the efficiency of filtering and sweetening action and ease of replacement. In one embodiment the filter element is formed as an elongated member having layers of filtering media of different particle size or porosity through which the liquid to be filtered is passed. In another embodiment the filter element has a combination of a fibrous filtering media and a finely divided absorbent material in alternate layers. A tubular filter element is disclosed having a wall composed of an inner layer of coarse filter paper, an intermediate layer of medium filter paper and an outer layer of fine filter paper, with diatomaceous earth or the equivalent interposed between the layers. The filter element is provided with a wall having engaging means whereby the filter can be readily removed from the fryer. In another embodiment a filter trough is provided into which the liquid fat overflows and passes through interposed layers of graded filter media. Other embodiments are disclosed.

3,646,883

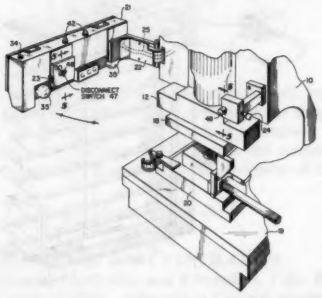
PUNCH PRESS WITH SWING-OUT CONTROL PANEL

Mike A. Provi, Rockford, Ill., assignor to Rockford Iron Works Inc., Rockford, Ill.

Filed Oct. 19, 1970, Ser. No. 81,859

Int. Cl. B30b *15/14*

U.S. Cl. 100—53 **10 Claims**



A control panel is hinged to swing like a door outwardly from the front of the frame away from the ram in order for the setup man or maintenance man to have clear access to all the press, ram, screw, and bed area for repairing or setting up the press, this control panel, for safety reasons, having a main disconnect switch incorporated therein with electric wires running inside the panel and thence through the frame at the hinged end of the panel to a main control box, the entire wired track being fully insulated. This main disconnect switch is opened automatically under spring pressure when the control panel is swung away from the frame when the control panel is swung back and locked in its normal position. In that way all electrical connections and all air connections are disconnected automatically when the panel is swung outwardly, completely eliminating any possible mechanical or electrical mishap befalling the setup man or operator, as the machine is completely immobilized under these conditions. The control panel carries die lights on the inner side thereof for good illumination of the entire bed area to facilitate repairing and setup jobs, the panel serving as a reflector for these lights. A hinged cover plate on the front of the panel facilitates all of the assembling and wiring operations at the outset, besides affording easy access to everything carried in the panel whenever that may become necessary.

3,646,884

METHOD AND MEANS FOR MAKING A CARBON PATTERN ON A FLEXIBLE PRINTING PLATE

Billie J. Johnson, 702 Fairhope Ave., Fairhope, Ala.

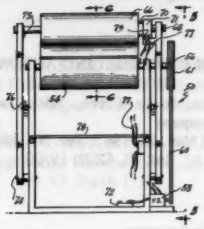
Filed July 7, 1969, Ser. No. 839,613

Int. Cl. B41d *7/00;* **B41c** *3/04*

U.S. Cl. 101—33 **5 Claims**

A pattern formed by heat transferable duplicating substances disposed in a predetermined array on a flexible sheet is transferred by application of heat to a flexible plate mounted on a cylindrical drum. The flexible plate is prestretched on the drum. The plate can then be removed

from the drum and mounted on a cylinder of a rotary press for printing pattern carbon sheets. Apparatus including the



cylindrical drum and means for applying heat thereto while the drum rotates to effect transfer of the pattern is described.

3,646,885

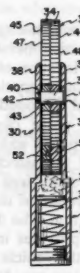
SCALE PATTERN AND ROUTE CONVERSION MARKER

Stanley J. Kolody, 1750 Burr Oak, Homewood, Ill.

Filed Feb. 4, 1969, Ser. No. 796,383

Int. Cl. B41f *5/10*; B41g *3/00*

U.S. Cl. 101—328 **1 Claim**



A marking apparatus is illustrated herein which discloses a body with a marking roller exposed at one end thereof. An applicator applies a marking substance such as ink to printing embossments on a circumferential surface of the roller when the roller is rotated or is rolled on a surface. The printing embossments are arranged in a pattern or patterns, and the pattern or patterns of the embossments are transferred or printed on the surface upon which the roller is rolled to mark a path or route on the surface as well as to transfer the pattern of embossments from the roller to the surface.

3,646,886

PLATE CYLINDER WITH INTERCHANGEABLE PLATE CLAMPING DEVICE

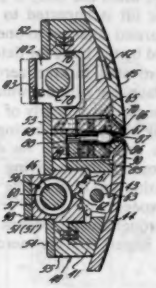
Richard Woessner, Fairlawn, N.J., and Alexander Z. Benda, Bronx, N.Y., assignors to Wood Industries, Inc., Plainfield, N.J.

Filed May 10, 1968, Ser. No. 728,185

Int. Cl. B41f *27/06;, 27/10, 27/12*

U.S. Cl. 101—378 **4 Claims**

Interchangeable sets of printing plate clamping devices for the plate cylinder of letterpress printing machines are provided, one set for clamping lead-backed electrotype plates on the plate cylinder and another set, interchangeable with the first set, for independently clamping plate saddles on the cylinder and thin wraparound printing plates under spring pressure on the saddles. Provision is made for independently



clamping two printing plates which are positioned side by side on the plate cylinder.

3,646,887

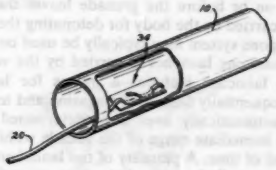
MODEL ROCKET AND SHOCK CORD RETAINER THEREFOR

George H. Stine, New Canaan, Conn., assignor to General Mills Fun Group, Inc., Minneapolis, Minn.

Filed July 30, 1970, Ser. No. 59,616

Int. Cl. F42b *15/00*

U.S. Cl. 102—34.5 **6 Claims**



A shock cord and retainer therefor. The shock cord retains in joined relation the nose cone and body tube of a model rocket during and after explosive separation of these parts, so that they will fall close together and be more easily recoverable. The retainer is a single piece of flexible material such as paper, to be attached inside the tube. Three holes which may be equidistant are cut into the piece of paper along its centerline. The cord is threaded through the holes with one end extending through the center hole to the top side of the paper. The cord extends along the bottom side of the paper then upward through a second hole, then around the side edge adjacent said hole, then again along the bottom surface, and finally upward through the third hole. The retainer is secured to the tube by an adhesive or bonding agent, such as glue or pressure-sensitive adhesive.

3,646,888

AERODYNAMIC DIRECTIONAL GRENADE, LAUNCHER THEREFOR AND WEAPONS SYSTEM UTILIZING THE SAME

Philip Lynn Posson, Suisun; Donald Baker Moore, San Lorenzo, and Dallas Earl Nicholson, Napa, all of Calif., assignors to Explosive Technology, Inc., Fairfield, Calif.

Filed Mar. 27, 1969, Ser. No. 811,702

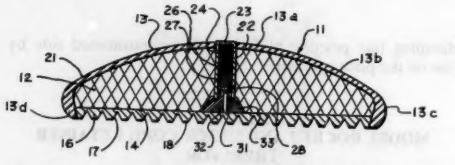
Int. Cl. F42b *13/48*

U.S. Cl. 102—67 **11 Claims**

An aerodynamic directional grenade in the form of a body formed of a high-energy explosive material, said grenade having a generally saucerlike configuration with upper and lower

surfaces that are adapted to sail through the air, the upper surface having a length in the direction of airflow which is greater than the length of the lower surface in the direction of airflow, whereby, when the body is propelled through the air an aerodynamic lift is imparted to the body. Fragment forming means is carried adjacent to one portion of the body, and means is carried by the body for detonating the body.

A launcher is provided for the aerodynamic directional grenade and has a launcher housing which carries a magazine that is adapted to receive a plurality of the grenades stacked one above the other, the housing having a discharge opening through which the grenades can be discharged. Means is mounted on the housing for receiving the grenades one by one from the magazine and discharging the same through the said opening at a speed so that the grenades are propelled aerodynamically through the air. Means is further included in said launcher to impart to the aerodynamic directional



grenade a degree of rotation resulting in gyroscopic stability about an axis generally transverse to the direction of aerodynamic flight, requisite to maintaining a favorable aerodynamic flight orientation and desired orientation at detonation. Means is mounted on the housing for initiating operation, on or before the grenade leaves the housing, of the means carried by the body for detonating the body.

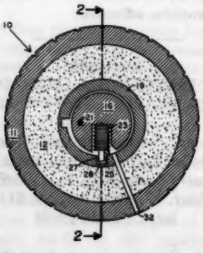
The weapons system may typically be used on a vehicle on which at least one launcher is carried by the vehicle and in which the launcher includes a means for launching the grenades sequentially from said magazine and to disperse the grenades automatically over a predetermined area within reasonably immediate range of the vehicle within a relatively short period of time. A plurality of the launchers can be provided to cover all the immediate area around the vehicle. The weapons system is capable of saturating the area immediately in the vicinity of the launcher with lethal fragments within a very short period of time.

3,646,889

BOMBLET FUZE SYSTEM

Edward J. Davis, Riverside, Calif., assignor to The United States of America as represented by the Secretary of the Navy

Filed July 9, 1970, Ser. No. 60,955
Int. Cl. F42c *5/02*
U.S. Cl. 102—70 B **5 Claims**



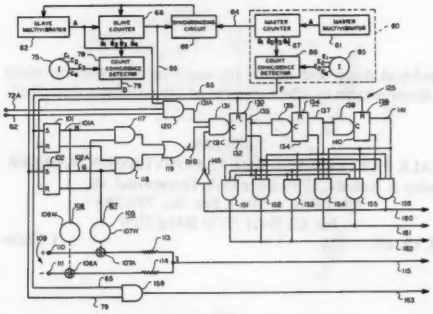
A bomblet fuze arming device for use inside a bomblet which is dispensed from a container by a remote means; the device utilizes gas or air pressure to compress an enclosed cavity of air which in turn unlocks a stab-detonator holder and during release from the bomb dispenser performs the arming function by use of a reaction turbine, which locks at the end of the arming function.

3,646,890

MEANS FOR CONTROLLING AUTOMATICALLY MOVED VEHICLE

James H. Snyder, Battle Creek, Mich., assignor to Clark Equipment Company

Filed Nov. 28, 1969, Ser. No. 880,582
Int. Cl. G05b *19/00*
U.S. Cl. 104—1 **31 Claims**



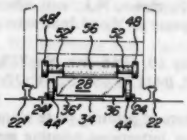
A material unit handling and storage system has a stacking vehicle movable within an aisle between loading stations at each column of bins. The location of the vehicle within the aisle is sensed by a group of magnetically activated switches on the vehicle that respond to coded magnetic strips placed adjacent each station. A pulse clock and pulse counter system provide correlated pulses and information on the location of the vehicle and the selected destination for the vehicle is stored in count coincident detectors that produce an output upon the occurrence of the pulses corresponding to the location and destination. The difference in time of the occurrence of the pulses provides information to a driving control means that moves the vehicle in the desired direction at high, intermediate and low speeds as it nears its destination and at a fine positioning speed when it arrives at its destination.

3,646,891

CONTROLLING SYSTEM FOR MEANS FOR ADJUSTING SPEEDS OF FREIGHT CARS IN A YARD

Kenichi Murato, Yokohama; Kenji Takei, and Masayuki Takayama, both of Katsuta, all of Japan, assignors to Japanese National Railways and Hitachi, Ltd., Tokyo, Japan

Filed Mar. 3, 1970, Ser. No. 16,181
Claims priority, application Japan, Mar. 10, 1969, 44/17540
Int. Cl. B61j *3/12*
U.S. Cl. 104—26 R **11 Claims**



A controlling system for means for adjusting speeds of freight cars in a yard, which is designed such that self-

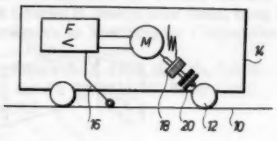
powered freight car speed adjusting means having arms to catch a thrust freight car, in catching said freight car, detects the freight car at a point a predetermined distance ahead of said arms, whereby it is preliminarily accelerated to make the speed differential between it and the freight car small.

3,646,892

TRACTION UNIT FOR ELECTRIC MODEL RAILWAYS

Attila Halmai, and Geza Halmai, both of Budapest, Hungary, assignors to Nikex Nehizipari Kulkereskedelmi Vallalat, Budapest, Hungary

Filed Dec. 16, 1969, Ser. No. 885,439
Claims priority, application Hungary, Dec. 28, 1968, HA-865
Int. Cl. B61b *11/00*
U.S. Cl. 104—148 **3 Claims**



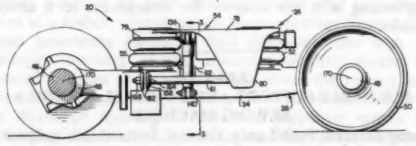
In a traction unit for electric model railways consisting of a two-phase synchronous electric motor and an electronic unit for supplying the electric motor with two-phase pulse voltages from a feed voltage taken from the rails, an elastic clutch and, preferably, also a torque limiter is provided in the mechanical connection by means of which the electric motor drives the traction wheels, whereby the modeling range is extended to the use of quite low frequencies and, thus, to small revolution numbers of the traction wheels.

3,646,893

RESILIENT RAILWAY CAR TRUCK

Gustav B. Sundby, Atchison, Kans., assignor to Rockwell Manufacturing Company, Pittsburgh, Pa.

Filed Oct. 2, 1969, Ser. No. 863,039
Int. Cl. B61f *3/08, 5/10, 5/12*
U.S. Cl. 105—182 R **28 Claims**



A railway car in which the car body is pivoted to a truck about a suspension adapter disposed in supporting relationship to its under side and in which the car body is in part supported directly from the truck frame and in part supported from the frame through the suspension adapter.

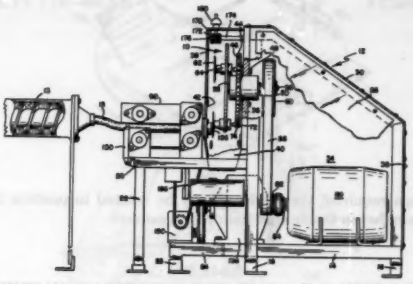
3,646,894

EXTRUDING AND CUTTING DOUGH

Mark Hasten; Lee S. Jones, and Denis L. Pommer, all of Minneapolis, Minn., assignors to General Mills, Inc.

Original application Dec. 23, 1966, Ser. No. 604,338, now Patent No. 3,491,637. Divided and this application Dec. 17, 1969, Ser. No. 888,104
Int. Cl. A21d *8/02*
U.S. Cl. 99—86 **2 Claims**

An apparatus for cutting or slicing a rope of material into slices of predetermined thickness without deforming the rope or the slice during the cutting operation. A circular cutting blade, mounted for rotation about two different axes, slices



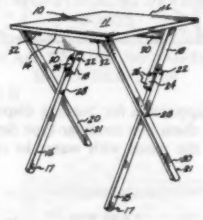
the rope as it is advanced toward the blade at a predetermined feed rate.

3,646,895

TABLE WITH FOLDING LEGS

Richard B. Campbell, 5808 Princeton Ave. N.E., Seattle, Wash.

Filed Sept. 2, 1970, Ser. No. 68,891
Int. Cl. A47b *3/02*
U.S. Cl. 108—118 **3 Claims**



A table with folding legs is easily set up and folded away using one hand, while the other hand may be holding, for example, a tray with food. Four diagonal legs are used in an arrangement providing complete clearance for a person's legs beneath the table. Although the table in use is level, when folded, two legs on opposite sides of the table extend further downwardly than the other two legs and during the unfolding, the bottoms of these longer legs serve as fulcrums, as the tabletop is pivoted into a level position.

3,646,896

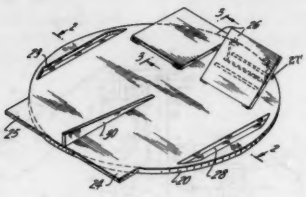
SUNBATHER'S ROTATABLE PLATFORM

Ruth Derujinsky, 165 West End Ave., New York, N.Y., and Patricia Field, 295 Third Ave., New York, N.Y.

Filed July 16, 1969, Ser. No. 842,164
Int. Cl. A47b *11/00*; A47g *9/00*; E04b *1/346*
U.S. Cl. 108—139 **4 Claims**

A sunbather's recreational device in which a platform is mounted for rotation on a base. The platform is provided with a gnomon or style, the position or length of its shadow

upon the platform serving as an indicator or reference of the position of the sun with relation to the sunbather, so that



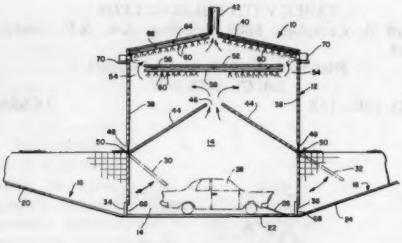
when required, the platform may be rotated to position the sunbather in the desired path of the sunrays.

3,646,897

METHOD AND APPARATUS FOR POLLUTION FREE BURNING OF AUTOMOBILE BODIES

James W. Snelling, Omaha, Nebr., assignor to Amex Corporation, Las Vegas, Nev.

Filed Apr. 23, 1970, Ser. No. 31,256
Int. Cl. F23g 7/00
U.S. Cl. 110—8 A **18 Claims**



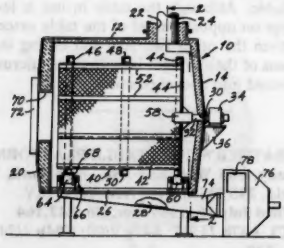
A method and apparatus for burning disposed automobile bodies by burning them in a modular-type device and successively contacting the gases with water to remove the contaminates.

3,646,898

REFUSE INCINERATING APPARATUS

Elliott Bavers, New York, N.Y., assignor to Rotodyne Manufacturing Corporation, Brooklyn, N.Y.

Filed May 28, 1970, Ser. No. 41,379
Int. Cl. F23g 5/06
U.S. Cl. 110—14 **16 Claims**



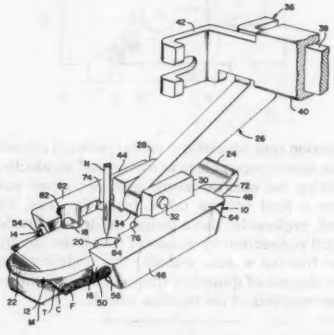
Incinerating apparatus for a mixture of combustible and noncombustible waste material consisting of a furnace and perforated cylindrical grating rotatably mounted within the furnace. The grating includes a closure at one end and a rigid frame surrounding its cylindrical and end walls. The frame includes circular ribs which are supported on rollers within the furnace and the grating is rotated by a shaft connected to the frame at the closed end thereof and projects through a furnace wall. An opening is formed in the bottom of the furnace leading into a hopper, for ash residue from which the ash may be removed by suction.

3,646,899

SLIDE FASTENER PRESSOR FOOT

Rolfe E. Reynolds, Meadville, and Louis L. Spencer, Conneaut Lake, both of Pa., assignors to Textron Inc.

Filed Sept. 23, 1969, Ser. No. 4,791
Int. Cl. D05b 29/00
U.S. Cl. 112—235 **12 Claims**



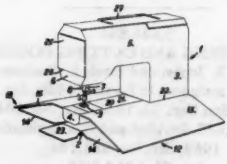
A slide fastener presser foot directly attached to a sewing machine pressor foot such that needle guiding apertures in the slide fastener presser foot are aligned with needle guiding recesses in the sewing machine presser foot whereby the slide fastener presser foot may stitch a hidden slide fastener to a garment to provide a seamlike appearance. Attachments for use with the slide fastener presser foot include an adapter to fit in the receiving channel and a mounting shank slidably cooperating with the adapter for attachment to a sewing machine.

3,646,900

FOLDABLE SUPPORT AND COVER FLAPS FOR A SEWING MACHINE

Marcel Fresard, Petit-Lancy, Geneva, Switzerland, assignor to Mefina S.A., Beaumont, Fribourg, Switzerland

Filed Jan. 13, 1970, Ser. No. 2,525
Claims priority, application Switzerland, Jan. 24, 1969, 1075/69
Int. Cl. D05b 73/10
U.S. Cl. 112—258 **10 Claims**



The sewing machine has flaps hinged to the frame forming a carrying case therewith and are foldable downwards to

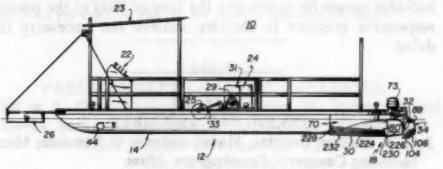
form a worktable. The flaps are hinged along the base of the machine and are in two portions with connecting hinges enabling the outer edges of the flaps to rest on the base clear of the free arm. The connecting hinges have two hinging axis positions laterally separated and parallelly separated by a slideway, enabling the flaps to form a worktable either flush with the top surface of the free arm or below and clear of the latter. A lug holds the two portions blocked for the packing position of the flaps. A front flap may be one piece or of two hinged portions and attached to the front edge of the base.

3,646,901

WATERCRAFT ESPECIALLY USEFUL FOR THE RECOVERY OF OIL

Allan R. Budris, Nutley; Frank J. McGowan, Murray Hill; Lewis M. Evans, Upper Montclair; Theodore J. Wayne, Linden, all of N.J.; Eric E. Lithen, Garden City, Long Island, and Charles B. Darcy, Glen Head, Long Island, both of N.Y., assignors to Worthington Corporation, Harrison, N.J.

Filed Feb. 2, 1970, Ser. No. 7,650
Int. Cl. B63b *35/00*; B63h *11/00*
U.S. Cl. 114—0.5 **64 Claims**



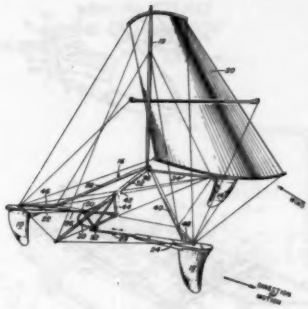
A watercraft is disclosed which comprises a body member of the catamaran-type having spaced-apart twin hulls between which is disposed an oil recovery system which can recover oil (for instance in the form of an oil slick) which has been properly directed by the hulls of the craft. The watercraft has a generally centrally located turning axis; first and second propulsor means secured to the body member for accepting water at an inlet opening thereof and discharging water at a higher velocity at discharge openings thereof; first thrust generating means in fluid communication with the discharge opening of the second propulsor means for generating thrust in a first direction about the turning axis; second thrust generating means in fluid communication with the discharge opening of the first propulsor means for generating thrust in the first direction about the turning axis; third thrust generating means in fluid communication with the discharge opening of the first propulsor means for generating thrust in a second direction about the turning axis; fourth thrust generating means in fluid communication with the discharge opening of the second propulsor means for generating thrust in the said second direction about the turning axis; and maneuverability control means on the body member for selectively establishing an nonestablishing the fluid communication between the first and second propulsor means and the first, second, third, and fourth thrust generating means respectively. Additionally each of the propulsor means may be removably secured to the rear of the body member and includes a particularly advantageous construction comprising a multifunction one-piece casting; a propulsor housing secured to the undersurface of a rearwardly extending portion of the one-piece casting; a prime mover secured to the upper surface of the said rearwardly extending portion of the one-piece casting; and a water gathering collection chamber secured to the propulsor housing for helping to establish the necessary pressure head used in the maneuverability system of the craft.

3,646,902

AEROHYDROFOIL STEERING CONTROL

Bernard Smith, 503 Sampson, Dahlgren, Va.

Filed Jan. 19, 1970, Ser. No. 3,738
Int. Cl. B63b *1/18, 35/00*
U.S. Cl. 114—66.5 H **3 Claims**



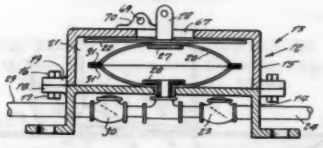
A hydrofoil sailboat having a rotatable bellcrank member to provide a single control for maneuvering and steering the boat on all points of sailing. The bellcrank member has its ends pivotally connected to two push rods which slide in hydrofoil extensions and rotate the hydrofoils to control the direction of travel of the hydrofoil craft. By rotation of the single bellcrank member, simultaneous control of the two windward hydrofoils is achieved.

3,646,903

PROPULSION AND STEERING DEVICE FOR SMALL BOATS

Malte Hansson, Route #3, Box #317, Cottonwood, Calif.

Filed Apr. 15, 1970, Ser. No. 28,852
Int. Cl. B63h *11/00*
U.S. Cl. 115—12 R **5 Claims**



A kit that can be installed in a small boat for providing a novel means for propelling and steering the boat, the device incorporating a hydraulic propulsion assembly, a jet assembly and a steering cable assembly controlled by a steering wheel, and wherein the steering and the power is in one element.

3,646,904

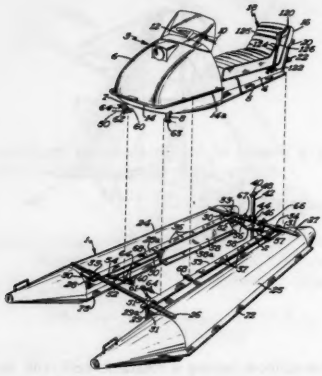
REMOVABLE FLOTATION MEANS AND WATER DRIVE ASSEMBLY FOR SNOWMOBILES

Charles T. Lanning, 7305 Clinton Ave., Richfield, Minn., and James T. Cook, 5 North Broadway, Watertown, S. Dak.

Filed Oct. 31, 1969, Ser. No. 873,778
Int. Cl. B60f *3/00*
U.S. Cl. 115—1 **6 Claims**

A conversion kit including a pontoon assembly, steering rudder and propeller with interconnected drive shaft and power transmission is utilized to adapt a snowmobile for use as a water vehicle by being removably mounted thereon. Turning linkage attached to the rudder is connected to the

ski spindle steering mechanism of the snowmobile for operation thereby. The transmission of the propeller drive assembly includes a power input shaft sized to be rotatably supported transversely of the snowmobile frame in the bearings



where the front drive axle for the snowmobile track is normally mounted, the power input shaft being driven by the same sprocket and chain arrangement from the snowmobile engine ordinarily employed to drive the front drive axle.

3,646,905

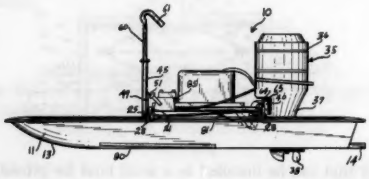
SELF-PROPELLED VEHICLE

Werner W. Martinmaas, 835 10th Ave. N.W., Watertown, S. Dak.

Filed Mar. 18, 1970, Ser. No. 20,495

Int. Cl. B63b *35/00*

U.S. Cl. 115—70 **12 Claims**



A pair of skis adapted to support an operator for operation in a manner simulating conventional skiing are mounted on a frame in a laterally spaced generally parallel relationship for pivotal movements relative to the frame on axes extending longitudinally of the skis. An outboard motor is mounted on the frame for steering movements on a vertical axis so as to depend between the skis forwardly of the rear end thereof. A lever, pivotally mounted on the frame for movements transversely of the skis, is connected to impart simultaneous pivotal movements to the skis on their pivotal axes in a common direction for high-speed turning maneuvers and a shaft rotatably carried by the lever is operatively connected to impart steering movements to the outboard motor in unison with or independently of pivotal movement of the skis on their pivotal axes.

3,646,906

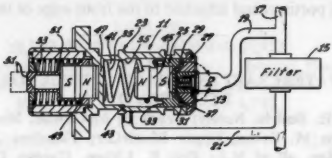
PRESSURE INDICATOR AND SURGE CONTROL DEVICE

Kurt F. Hammer, Camarillo, Calif., assignor to Purolator Products, Inc., Rahway, N.J.

Filed Feb. 1, 1968, Ser. No. 702,442

Int. Cl. G01l *19/12*

U.S. Cl. 116—70 **9 Claims**



This disclosure describes a pressure indicator of the type having a pressure-responsive member which is exposed to relatively high-pressure and relatively low-pressure fluid. A surge control device is interposed in the high-pressure line upstream of the fluid-responsive member to interpose a time delay for actuation of the indicator which is sufficient to cancel out the effect of pressure surges. The surge control device includes means for restricting the flow of fluid to the pressure responsive member to thereby achieve the necessary time delay.

3,646,907

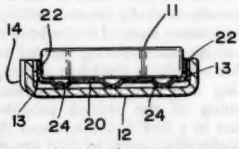
INKING PAD ASSEMBLY

John S. Dudley, Douglas, Mass., assignor to Dennison Manufacturing Company, Framingham, Mass.

Continuation-in-part of application Ser. No. 839,925, July 8, 1969, now abandoned. This application Jan. 28, 1970, Ser. No. 6,340

Int. Cl. B05c *11/10*

U.S. Cl. 118—264 **6 Claims**



An inking pad assembly suitable for use with a marking machine, the inking pad assembly having an ink pad partially positioned in a box or holder, the pad being located by a plurality of raised portions above the inside bottom of the box or holder, at least one of said portions dividing the box bottom into a plurality of ink reservoirs.

3,646,908

APPARATUS FOR COATING FIBERS

Dennis Herbert Bowen, North Stoke; Neville John Mattingley, Abingdon, and Ronald Alfred James Sambell, Reading, all of England, assignors to United Kingdom Atomic Energy Authority, London, England

Filed Oct. 30, 1969, Ser. No. 872,593

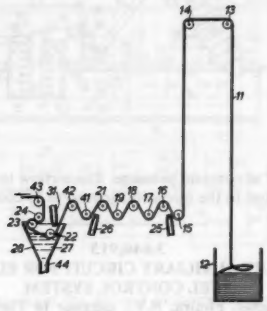
Claims priority, application Great Britain, Nov. 1, 1968, 52,023/68

Int. Cl. D01d *11/06*

U.S. Cl. 118—304 **5 Claims**

Apparatus for coating carbon, glass and like fibers to make a composite using resin, glass, metal etc., matrix comprises a

plurality of rollers passing the fibers through a container of a slurry or solution of the matrix material. At least one fluid jet



is provided urging the fibers away from contact with a roller. The fluid jet may be gas or the matrix material or both.

3,646,909

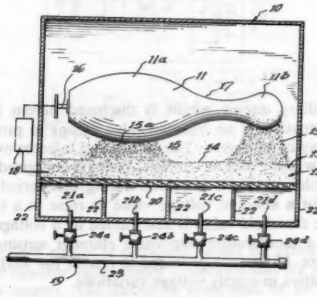
VARIABLE DEPTH COATING APPARATUS

William J. Cole, Muskegon, and Anton W. Rytina, Grand Haven, both of Mich., assignors to Brunswick Corporation

Filed Jan. 23, 1970, Ser. No. 5,317

Int. Cl. B05c *5/02*

U.S. Cl. 118—629 **2 Claims**



Apparatus for coating a body with a variable depth coating by means disposed externally of the body. In one form, the means comprises means for delivering a nonuniform cloud of coating particles to the body for deposit thereon to define a preselected nonuniform coating. In another form, the means comprises means for providing a uniform cloud of coating particles to the body and means for removing at least a portion of the deposited particles. The removing means comprises in one form means for blowing off deposited particles and in another form means for brushing off deposited particles. Electrostatic means may be employed for releasably retaining the deposited particles.

3,646,910

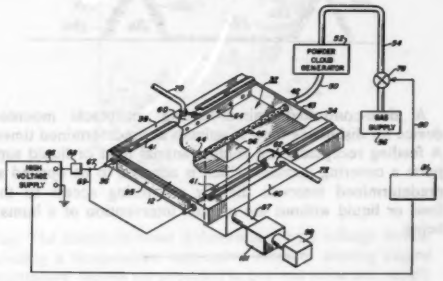
DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGES

Ronald L. Cade, Fairport, and Michael A. Vince, Penfield, both of N.Y., assignors to Xerox Corporation, Rochester, N.Y.

Continuation-in-part of application Ser. No. 832,697, June 12, 1969, now abandoned. This application Nov. 10, 1969, Ser. No. 875,015

Int. Cl. G03g *13/00*

U.S. Cl. 118—637 **4 Claims**



Powder cloud development apparatus for developing latent electrostatic images comprising ion emitters adjacent a chamber area into which developer particles are introduced. The ion emitters are enclosed and have a plurality of apertures formed on an enclosing wall facing towards the chamber. When the ion emitters are energized, gas introduced therein is ionized and the ions are forced out through the apertures into the chamber area, thereby charging the developer particles. The developer particles are prevented from entering the ion emitters through the apertures by maintaining a pressure differential between the ion emitters and the camber.

3,646,911

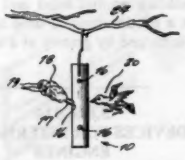
SORGHUM SEEDHOLDER BIRD FEEDER

Charles L. Parson, 76 N. Ogden Ave., Columbus, Ohio

Filed May 11, 1970, Ser. No. 36,264

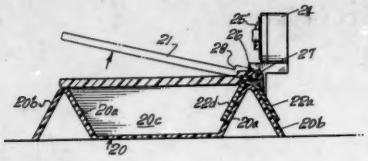
Int. Cl. A01k *5/00*

U.S. Cl. 119—51 **1 Claim**



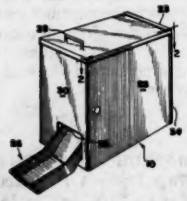
A bird feeder composing an elongated body with diagonal openings on the vertical side thereof for receiving and supporting the stalks of heads of sorghum grains, the body having a hook hanger at the upper end for suspension from a tree branch, and the lower end of the body having a removable plug with a downward nail for pounding into a supporting fence, rail or fencepost.

3,646,912
TIME-CONTROLLED ANIMAL ACCESS PERMITTING DEVICE
Joan E. Gardner, 11642 Kiowa St., Los Angeles, Calif.
Filed Feb. 20, 1970, Ser. No. 13,099
Int. Cl. A01k 5/02
U.S. Cl. 119—51.12 2 Claims



A time-controlled animal-feeding receptacle mounted device for disbursing food to animals at predetermined times. A feeding receptacle for holding animal food or liquid supports a covering member which is adapted to be opened at predetermined intervals thereby permitting access to the food or liquid without the manual intervention of a human being.

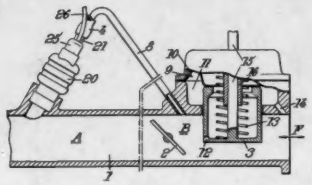
3,646,913
TIME-OPERATED SEQUENTIAL DUMPING ANIMAL FEEDER
Chester W. Jenkins, 1184 North Waukegan Road, Lake Forest, Ill.
Filed Sept. 11, 1969, Ser. No. 856,972
Int. Cl. A01k 5/02
U.S. Cl. 119—51.13 8 Claims



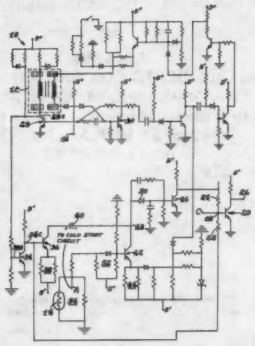
An apparatus for automatically feeding animals at a predetermined time is provided and includes at least one container for holding animal food and means for dumping the container at a predetermined time to cause the contents thereof to be discharged by gravity at a location accessible to the animal.

3,646,914
FUEL FEED DEVICES FOR INTERNAL COMBUSTION ENGINES
Andre Louis Mennesson, Neuilly-sur-Seine, France, assignor to Societe Industrielle de Brevets et d'Etudes S.I.B.E., Neuilly-sur-Seine, France
Filed Feb. 19, 1970, Ser. No. 12,581
Claims priority, application France, Feb. 25, 1969, 6904749
Int. Cl. F02d 5/00
U.S. Cl. 123—32 EA 6 Claims

Liquid fuel is injected under pressure into the induction pipe downstream of the main throttle valve. The fuel flow is metered to the injection orifice by a valve actuated by an electromagnet according to the airflow in the induction pipe. The injection orifice is aligned with an auxiliary orifice in an air chamber at constant pressure. The airflow to the chamber is carried close to the electromagnet so as to cool it.



3,646,915
COLD START AUXILIARY CIRCUIT FOR ELECTRONIC FUEL CONTROL SYSTEM
Todd L. Rachel, Elmira, N.Y., assignor to The Bendix Corporation
Filed June 16, 1970, Ser. No. 46,706
Int. Cl. F02m 51/00
U.S. Cl. 123—32 EA 9 Claims

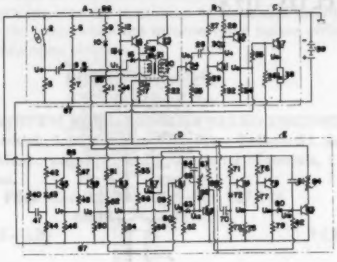


An auxiliary circuit means is disclosed herein for controlling actuation of an injector valve means to provide for cold starting of an engine. The circuit and injector means are energized when a vehicle ignition system is energized and the fuel for cold starting is provided during the period of time required for a selected voltage value to raise to a threshold value. The threshold value is determined by a voltage divider including a temperature-responsive element sensing engine temperature. Means are provided to render the auxiliary circuit insensitive to supply voltage variations.

3,646,916
ELECTROMAGNETIC FUEL INJECTION CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES
Takashi Inoue, and Yoshiaki Abe, both of Higashi-Matsuyama, Japan, assignors to Diesel Kiki Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 24, 1970, Ser. No. 22,154
Claims priority, application Japan, Mar. 24, 1969, 44/31255
Int. Cl. F02d 5/00
U.S. Cl. 123—32 E 1 Claim

An electromagnetic fuel injection control system for an internal combustion engine, including a first monostable circuit having timing elements for receiving pulses relating to the speed of rotation of the engine, a second monostable circuit whose output is used to energize an electromagnetic fuel in-

jection valve, and a charging-discharging circuit providing an output for use in varying the width of pulses in the first monostable circuit. The output of the first monostable circuit



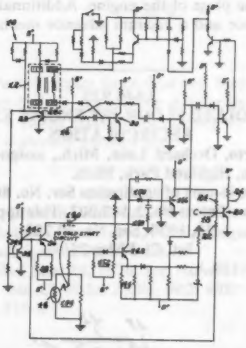
is applied as an input the second monostable circuit and is diverted for application as an input to the charging-discharging circuit.

3,646,917

AUXILIARY CIRCUIT FOR ELECTRONIC FUEL CONTROL SYSTEMS TO FACILITATE COLD STARTING

John R. Nagy, Detroit, Mich., assignor to The Bendix Corporation

Filed June 16, 1970, Ser. No. 46,705
Int. Cl. F02m *51/02*
U.S. Cl. 123—32 EA **14 Claims**



An auxiliary circuit is disclosed herein for controlling actuation of injector valve means to provide fuel for cold starting of an engine. The circuit is comprised of an interconnected pair of multivibrators and is adapted to produce an injector means control signal for a period of time representative of the fuel requirement for cold starting of the associated internal combustion engine. In order to permit the fuel to be pressurized, a time delay period is provided.

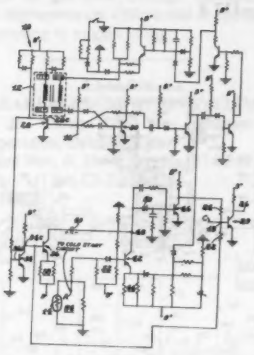
3,646,918

COLD START AUXILIARY CIRCUIT FOR ELECTRONIC FUEL CONTROL SYSTEM

John R. Nagy, Detroit, Mich., and Todd L. Rachel, Elmira, N.Y., assignors to The Bendix Corporation

Filed June 16, 1970, Ser. No. 46,681
Int. Cl. F02m *51/00*
U.S. Cl. 123—32 EA **12 Claims**

An auxiliary circuit means is disclosed herein for controlling actuation of an injector valve means to provide for cold starting of an engine. The circuit and injector means are energized when a vehicle ignition system is energized and the fuel for cold starting is provided during the period of time required for a selected voltage value to raise to a threshold



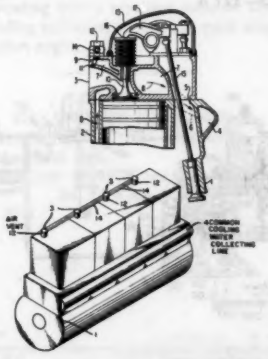
value. The threshold value is determined by a voltage divider including a temperature responsive element sensing engine temperature. Means are provided to prevent noise and supply voltage variations from affecting the capability of the circuit to compute a cold start injection pulse of requisite duration.

3,646,919

COOLING WATER CONDUCTOR SYSTEM IN RECIPROCATING PISTON INTERNAL COMBUSTION ENGINES

Josef Reisacher, Wendlingen (Neckar), Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart-Untertürkheim, Germany

Filed July 21, 1970, Ser. No. 56,806
Claims priority, application Germany, July 22, 1969, P 19 37 146.1
Int. Cl. F02f *4/38;* **F02b** *75/20;* **F01p** *3/02*
U.S. Cl. 123—41.82 **11 Claims**

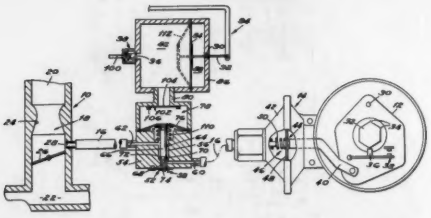


A cooling water duct system for reciprocating piston internal combustion engines, particularly for those engines with several cylinder heads, whose discharge apertures for the cooling water are connected to a common collecting line arranged outside of the cylinder heads whereby the collecting line is secured at the cylinder block below the cylinder head seal and the cylinder heads are provided with a vent bore at the highest place of their cooling water spaces.

3,646,920
CARBURETOR FUEL PUMP PRESSURE-ACTUATED SPARK TIMING CONTROL

Richard D. Vartanian, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 2, 1970, Ser. No. 94,363
Int. Cl. F02p 5/10
U.S. Cl. 123—117 A 13 Claims

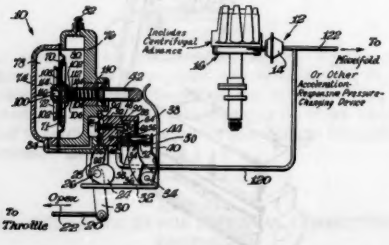


The vacuum line between the carburetor spark port and the engine distributor breaker plate servo actuator includes an air bleed valve that is normally closed to permit normal advance of the engine timing as a function of spark port vacuum changes, but opens during vehicle accelerations to bleed air to the distributor servo to condition the timing for retarded operation; the bleed valve being opened in response to fuel pressure in the carburetor accelerating pump fuel well acting on a diaphragm attached to the valve during operation of the pump, and, of which the following is a specification.

3,646,921
REDUCING ENGINE EMISSIONS

Frederick J. Marsee, Clawson, Mich., assignor to Ethyl Corporation, New York, N.Y.

Continuation-in-part of application Ser. No. 611,346, Jan. 24, 1967, now abandoned. This application July 17, 1969, Ser. No. 857,255
Int. Cl. F02p 5/04
U.S. Cl. 123—117 A 11 Claims

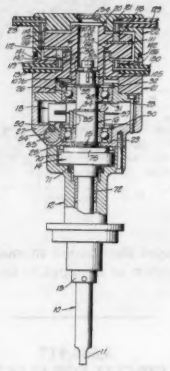


At part-throttle accelerations, ignition timing of spark-ignition engine is sharply retarded for at least a few seconds to reduce hydrocarbon and nitrogen oxide emissions from exhaust. Retarding can be made responsive to throttle-opening movement or acceleration inertia of rotating part of engine. Fluid-flow and electric-heating arrangements are shown for determining the length of the retard period.

3,646,922
IGNITION SYSTEM

Thomas P. Spalding, 245 Grand Ave., Monrovia, Calif.

Filed Nov. 13, 1969, Ser. No. 876,540
Int. Cl. F02p 5/06
U.S. Cl. 123—117 A 15 Claims

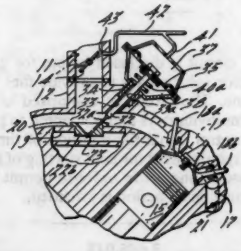


There is disclosed herein an ignition system of the capacitor discharge-type. The ignition system includes a source and cell, and a shutter therebetween driven from a suitable member of an internal combustion engine. The source and cell are included in a circuit arrangement for properly triggering an ignition coil. A new cap and rotor structure is disclosed for distributing voltage from the secondary of the ignition coil to the plugs of the engine. Additionally, a new centrifugal advance and a vacuum advance mechanism are disclosed.

3,646,923
CONTROLLED FLOOR JET ENGINE EXHAUST RECIRCULATION

Jorma O. Sarto, Orchard Lake, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Continuation-in-part of application Ser. No. 807,705, Mar. 17, 1969, now Patent No. 3,542,003. This application Apr. 22, 1970, Ser. No. 30,723
Int. Cl. F02m 25/06
U.S. Cl. 123—119 A 13 Claims



Automobile exhaust gases are recycled by means of a bypass duct which receives these gases at a restricted upstream end located within the environment of the hot gases of the exhaust system, passes in heat exchange relationship through the conventional intake manifold hotspot to facilitate heating of the latter, and discharges the hot exhaust gases in an upstream direction with respect to the inlet flow of the fuel-air mixture at a location directly below the throt-

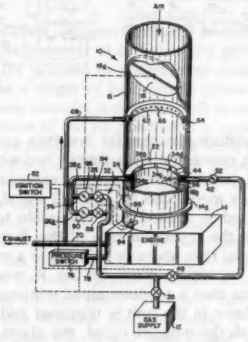
tle valve. The restriction of the upstream end is spaced from the hotspot to minimize heat loss to the latter, such that lead contaminants for example flow in a gaseous phase through the restriction without fouling the same. A bypass control plunger movable in response to the position of the throttle valve is insertable into the restriction to close and simultaneously clean the latter when the throttle valve moves either to its idle or wide open position.

3,646,924

FUEL SYSTEM FOR GASEOUS FUELED ENGINES

Marc S. Newkirk, Lynnfield, and W. Peter Zulkowski, Salem, both of Mass., assignors to International Materials, Lynnfield, Mass.

Filed Mar. 23, 1971, Ser. No. 127,146
Int. Cl. F02n *21/02*
U.S. Cl. 123—120 **7 Claims**



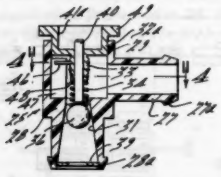
A gaseous fueled engine has a dual fuel feed system which provides a lean fuel-air mixture for starting the engine when it is cold and a richer mixture for starting or operating the engine after it is already warmed up.

3,646,925

CRANKCASE VENTILATION

Robert W. Eshelman, Ann Arbor, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed June 24, 1970, Ser. No. 49,474
Int. Cl. F02m *25/06*; **F02f** *9/00*
U.S. Cl. 123—119 B **9 Claims**



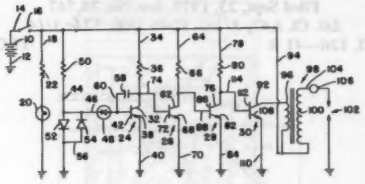
The crankcase for an internal combustion engine is vented to the fuel-air inlet induction passage via a ventilation valve comprising a tubular L-shaped valve housing having a comparatively small metering orifice which cooperates with a movable valve element responsive to decreasing pressure in the induction conduit for restricting the orifice. A coil spring yieldingly opposes closing movement of the valve element and is seated on a spring retainer adjustably mounted in an opening through the sidewall of the housing at the exterior angle of its elbow to effect a predetermined rate of gas flow through the orifice when a predetermined low-pressure differential corresponding to part load operation of the engine is applied across the orifice. A movement limiting plunger extends adjustably through the retainer to engage and limit closing movement of the valve element to effect a predetermined low rate of gas flow through the orifice when a predetermined highepressure differential is applied across the orifice corresponding to engine idling.

3,646,926

BREAKERLESS IGNITION SYSTEM

Alfred Plume, Jr., Carson City, Nev., assignor to Mallory Electric Corporation, Detroit, Mich.

Filed Nov. 6, 1969, Ser. No. 874,509
Int. Cl. F02p *3/02*
U.S. Cl. 123—148 E **4 Claims**



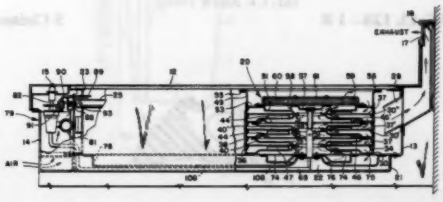
The breakerless ignition system is designed for use in connection with an internal combustion engine. A multistage transistor amplifier circuit is provided. The first stage of the amplifier includes a transistor which is biased to conduct when a photocell is energized. The photocell is energized by means of a light source in timed relation to engine operation. A capacitor is provided across the base collector of the first stage transistor to prevent inadvertent biasing thereof to conduct. The final stage of amplification includes a transistor which is normally biased to conduct. The primary winding of a step-up transformer is placed in the collector-emitter circuit of the final stage of amplification. When the transistor of the first stage of amplification is biased to conduct, the transistor of the final stage of amplification is placed in a nonconducting state to thereby cause collapse of the field in the primary winding with a resultant induced voltage in the secondary winding sufficient to fire the spark plugs of an internal combustion engine.

3,646,927

GAS SMOOTH TOP RANGE

Richard L. Perl, Mansfield, Ohio, assignor to The Tappan Company, Mansfield, Ohio

Filed June 15, 1970, Ser. No. 45,991
Int. Cl. F24c *3/04*
U.S. Cl. 126—39 J **13 Claims**



The range has plural radiant burners with individually associated heat exchangers and a common pressurized exhaust

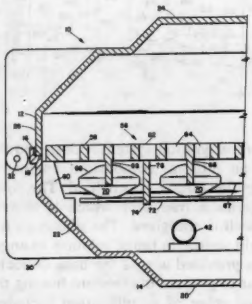
system. Each burner has a supply air tube the inlet end of which is obstructed by a coil spring which is variably expanded to act as an adjustable shutter regulating the amount of air that enters through its turns in response to actuation of the gas control valve for the burner. The burners have center simmer sections for low heat and single gas lines with port controlled terminals which variably direct the gas to the center simmer sections or to the main burner sections depending upon the rate of delivery of the same. A safety circuit prevents flow of gas to the range except when exhaust fans are properly operating, and a taut wire exposed to heating by all burners expands when any is above a selected temperature to signal such condition.

3,646,928

PORTABLE GAS-FIRED COOKING GRILL

Jim R. Grafton, Moline, Ill.; Glenn E. Wilkins, Davenport, Iowa, and Joseph F. Murphy, Moline, Ill., assignors to Blackhawk Metal Products, Inc., Davenport, Iowa

Filed Sept. 23, 1970, Ser. No. 74,747
Int. Cl. A47j *37/00*; F24b *3/00*; F24c *3/14*
U.S. Cl. 126—41 R **17 Claims**



A portable gas-fired cooking grill includes a portable, closable case formed by similar, opposite, top and bottom members hinged together along one edge, with a handle opposite the hinged edge. A gas burner is mounted in the bottom of the bottom member and removably connectable to a propane fuel supply. A grill spans the open top of the bottom member, and a plurality of ceramic briquettes are attached to the underside of the grill in a regular pattern above the gas burner.

3,646,929

FEMALE INCONTINENCE DEVICE

John Bonnar, Glasgow, Scotland, assignor to National Research Development Corporation, London, England

Filed Dec. 9, 1969, Ser. No. 883,450
Claims priority, application Great Britain, Dec. 10, 1968, 58,688/68
Int. Cl. A61b *19/00*
U.S. Cl. 128—1 R **5 Claims**

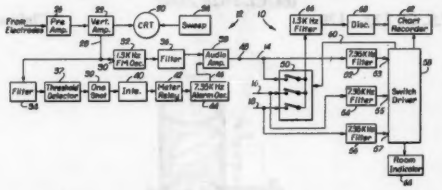
A female incontinence device comprising a support adapted for insertion into and stable retention in the vagina, a flexible diaphragm engaged at its periphery with the support, and remotely operable means carried by the support to elevate the diaphragm relative to the support and thereby upwardly displace both the urethra and bladder neck, while slightly elongating the urethra.

3,646,930

AUTOMATIC PHYSIOLOGICAL RECORDING AND ALARM SYSTEM FOR HOSPITALS

Robert E. Patterson, Raytown, and John L. Walker, Sr., Lake Lotawana, both of Mo., assignors to Johnnie Walker Medical Electronics Inc., Kansas City, Mo.

Filed Nov. 3, 1969, Ser. No. 873,564
Int. Cl. A61b *5/04*
U.S. Cl. 128—2.06 F **10 Claims**



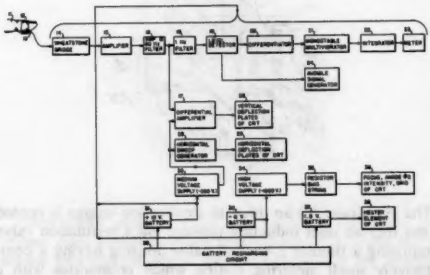
An EKG monitoring system for hospitals employing bedside units each connected by a simple two-wire cable to a remote central monitor having a chart recorder. A monitor signal, frequency modulated by an EKG signal, is produced by each unit and is carried over the cable to the central monitor. When the repetition rate of the R wave of a patient's EKG signal rises above or falls below a predetermined safe range of repetition rates, or the R wave amplitude decreases to less than a predetermined minimum amplitude, an alarm oscillator in the unit is triggered and its output is multiplexed with the monitor signal, the alarm and monitor signals being different in frequency. The central monitor is frequency discriminatory and responds to the alarm signal to activate the chart recorder and feed the monitor signal thereto from the unit at the bedside of the ailing patient.

3,646,931

PORTABLE BATTERY-POWERED INSTRUMENT FOR VISUALIZING THE PERIPHERAL PULSE WAVEFORM AND PULSE RATE

Jerry A. Phelps, 6013 Innes Trace Road, Louisville, Ky., and Donald J. Sass, 756 Forest Hills Drive S.W., Rochester, Minn.

Filed Feb. 25, 1970, Ser. No. 14,143
Int. Cl. A61b *5/02*
U.S. Cl. 128—2.05 T **1 Claim**



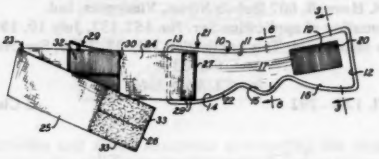
A compact transistorized pulse detector comprising a strain gauge attached to a finger. The output signal is amplified an filtered to trigger a monostable multivibrator, which signal is then integrated to give a readout of the pulse

rate on a meter. The pulse waveform is also visually displayed on a small, battery-powered CRT.

3,646,932
GROIN SUPPORT

August L. Schultz, 214 North Harmon Drive, Mitchell, S. Dak.

Filed Jan. 6, 1970, Ser. No. 921
Int. Cl. A61f 5/24
U.S. Cl. 128—95 **4 Claims**

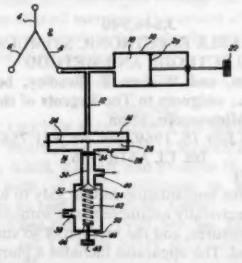


This specification discloses a support intended for application to a leg immediately at or below the groin area to provide support for strained or pulled groin muscles. The support comprises a length of hard plastic covered on its inner face with a foam material and of a length to substantially encircle that portion of the leg to which it is applied. The inner face of this component is concave in a transverse direction and its edges are contoured to provide support for injured muscles when tightly applied. A piece of Velcro fastening material is provided on the outer face of the hard plastic adjacent to its free end and a band of elastic material has one end secured to the outer face of the hard plastic at its other end. Spaced from the joinder of the elastic to the hard plastic and secured to the inner face of the elastic along one edge is a flap carrying another piece of Velcro fastening material which cooperates with the piece aforesaid in establishing a tightly wound inner ply of the hard plastic about the leg. Another Velcro piece is carried by the elastic on its outer face at approximately the location of the flap on the inner face and cooperating therewith in a final Velcro fastener on the inner face of the elastic at its free end. After the inner ply is achieved, the elastic is wound in a taut stretched condition about the inner ply, and the Velcro fasteners joined to establish an outer elastic ply which applies pressure to the inner ply.

3,646,933
PNEUMATIC RESPIRATOR COMPRISING A FLUID-OPERATED ALTERNATING CHANGEOVER SWITCH

Jean-Pierre Monnier, Clamart, France, assignor to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude

Filed Mar. 24, 1970, Ser. No. 22,157
Claims priority, application France, Mar. 25, 1969, 6908694
Int. Cl. A62b 7/02; F15c 1/12
U.S. Cl. 128—145.8 **7 Claims**

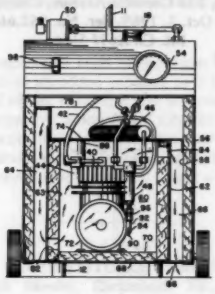


Pneumatic respirator comprising two stages in series. The first stage is a pneumatically operated changeover gas switch an exit of which is connected to a chamber the volume of which may be varied in order to vary the alternation frequency of the switch. The pressure inside the chamber actuates a valve which alternately opens and closes a passage between the respiratory passages of the patient and the source of gas to be insufflated.

3,646,934
AIR COMPRESSION EQUIPMENT FOR THERAPEUTIC USE

Daniel S. Foster, Grosse Pointe, Mich., assignor to W. D. Gale, Inc., Detroit, Mich.

Filed Nov. 20, 1969, Ser. No. 878,363
Int. Cl. A61m 16/02
U.S. Cl. 128—212 **7 Claims**

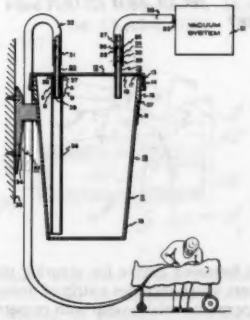


Self-contained apparatus for supplying cooled, dry, clean air under pressure for therapeutic use. A motor and compressor is contained in a sound-conditioned cabinet through which air is circulated to cool the motor and compressor. Condensate from the compressed cooled air is ejected into the cooling air through a pressure relief valve.

3,646,935
FLUID COLLECTION SYSTEMS

Le Grand K. Holbrook, and David S. Ostler, both of Salt Lake City, Utah, assignors to Medical Development Corporation, Salt Lake City, Utah

Filed Aug. 21, 1969, Ser. No. 851,955
Int. Cl. A61m 1/00
U.S. Cl. 128—276 **12 Claims**



The present invention comprises a body fluid bottle preferably taking the form of a container and a cover interlocked therewith. Included are respective vacuum and body-fluid conduits or ports constructed for communication with

interior of the container and for respective connection to a vacuum system and to appropriate means proximate the patient being supplied the same. Antisplash means may be provided. The body fluid conduit preferably extends into the container cavity and, in one form of the invention, includes means for preventing siphoning or back-flow of fluid stored in the container. Such means may comprise an apertured tube spaced from a body fluid conduit, for equalizing of gaseous pressure proximate the body fluid port with the remainder of the bottle interior, thereby avoiding dangers of back-flow or siphoning of contents of the bottle where gaseous pressure inside the container is raised above normal vacuum operating level. The container is constructed for insertion-stacking.

3,646,936

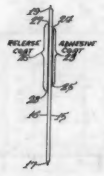
DRAINAGE POUCH AND METHOD OF MAKING

Arthur E. Marsan, 555 Cornelia Avenue, Chicago, Ill.

Filed Oct. 1, 1969, Ser. No. 862,665

Int. Cl. A61f *5/44*

U.S. Cl. 128—283 **10 Claims**



The invention is characterized by a drainage pouch having on one side an adhesive adapted to cover an area which surrounds the drainage opening in the patient's skin for sealing the pouch to the skin when applied for use, and a release material on the pouch in an area in coactive relation with the adhesive area, whereby in such coaction the adhesive area of one pouch will be covered by the release area. The invention is further characterized by the method of making the drainage pouch.

3,646,937

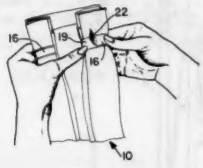
IMPROVED PRESSURE-SENSITIVE TAPE FASTENER FOR DISPOSABLE DIAPERS

Dale A. Gellert, Center Township, Dearborn County, Ind., assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 19, 1970, Ser. No. 12,656

Int. Cl. A61f *13/16*

U.S. Cl. 128—287 **10 Claims**



An improved fastening device for securing the corners of disposable diapers which includes a strip of pressure-sensitive tape held in superposed relationship with respect to a corner of the plastic backing sheet prior to use. One end of the tape is directly adhered to the plastic backing sheet. A treated release liner is interposed between the other end of the tape and the plastic backing sheet. The release liner is directly adhered to the backing sheet whereas the tape is releasably held in contact with the release liner. Securement means are provided for holding down the releasable end of the tape and maintaining it in contact with the release liner for the purpose of preventing inadvertent removal. The tape has a tab end between the securement means and the extremity of the releasable end of the tape to facilitate easy removal from the release liner when preparing the tape for fastening and holding the adjoining corners of a diaper.

3,646,938

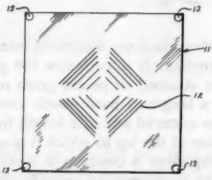
POSTPARTUM BLOOD LOSS RECEPTACLE

John N. Haswell, 607 Dubois Street, Vincennes, Ind.

Continuation of application Ser. No. 652,132, July 10, 1967, now abandoned. This application July 27, 1970, Ser. No. 64,083

Int. Cl. A61f *5/44*

U.S. Cl. 128—292 **3 Claims**



A thin pliable sheet having concentric graduations for receiving and measuring postpartum blood loss.

3,646,939

TOWEL CLAMP

John Sklar, Long Island City, N.Y., assignor to J. Sklar Mfg. Co., Inc., Long Island City, N.Y.

Filed Feb. 12, 1970, Ser. No. 10,818

Int. Cl. A61b *17/28, 17/08*

U.S. Cl. 128—321 **1 Claim**

The method of manufacture for a surgical towel clamp or the like is described in terms of the steps of the method to produce such an article in stainless steel from its initial condition as steel splits. The product of the method provides enlarged, opposed jaw ends for a scissorlike instrument, the jaw ends being disposed out of the plane of the instrument.

3,646,940

IMPLANTABLE ELECTRONIC STIMULATOR ELECTRODE AND METHOD

Gerald W. Timm, and William E. Bradley, both of Minneapolis, Minn., assignors to The Regents of the University of Minnesota, Minneapolis, Minn.

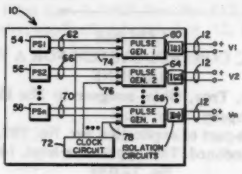
Filed July 15, 1969, Ser. No. 841,756

Int. Cl. A61n *1/36*

U.S. Cl. 128—421 **9 Claims**

An apparatus for implantation in the body to locally stimulate a mass of electrically excitable tissue without stimulating nearby tissue structures, and the method of so stimulating the tissue is described. The apparatus includes a plurality of electrodes, each of the electrodes including a pair of conductors for carrying signals of positive and negative polarity, each of

said conductors having a plurality of electrically conductive coupling points for coupling to the mass of tissue. Apparatus is also described for providing timed sequenced electrical impulses to the plurality of electrodes so that only one of the electrodes has a voltage applied between its input terminals at any given time. An insulating backing placed between the



electrodes and tissue structures surrounding the implanted stimulator for eliminating undesirable secondary tissue stimulation is also described. The method of applying controlled time-spaced electrical impulses to a mass of electrically excitable tissue structure for causing stimulation of that tissue structure is also described.

3,646,941

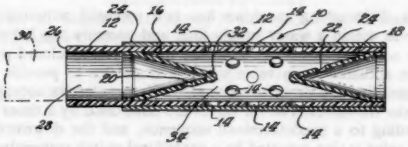
CIGARETTE AND/OR CIGARETTE HOLDER

Max J. Doppelt, deceased, late of Chicago, Ill. (by Jay A. Pritzker, administrator), assignor to E. A. Carey Pipe Company, Chicago, Ill.

Continuation-in-part of application Ser. No. 800,500, Feb. 19, 1969, now Patent No. 3,504,677, dated Apr. 7, 1970. This application Sept. 15, 1969, Ser. No. 857,740

Int. Cl. A24d *01/04*

U.S. Cl. 131—9 **3 Claims**



A cigarette or a cigarette holder for reducing the quantity of particulate, tar and nicotine, provide a cooler smoke, and considerably reduce toxic gases. It includes an apertured tubular member surrounded by a porous fibrous sleeve and a pair of generally cone-shaped members, one at the entrance end of the tubular member and the other at the exit or discharge end of the tubular member, with each cone-shaped member having a radial opening spaced from the inside of the tubular member and positioned approximately 180° from each other so that the smoke passing through the entrance cone is directed into the tubular member and mixed with air drawn thereinto and discharged through the radial opening in the exit cone-shaped member. The apices of the cone-shaped members may abut or may be mutually spaced along the longitudinal axis of the holder.

3,646,942

CIGARETTE MACHINE AND METHOD OF MANUFACTURING CIGARETTES

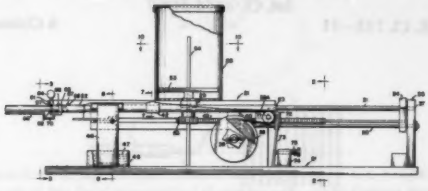
Clarence M. Asbill, Raleigh, and Frederic H. Heidelberg, Laurinburg, both of N.C., assignors to said Frederic H. Heidelberg by said Clarence M. Asbill

Filed Feb. 27, 1970, Ser. No. 15,037

Int. Cl. A24c *05/18, 05/24, 05/28*

U.S. Cl. 131—65 **21 Claims**

A cigarette machine and a method of manufacturing cigarettes suitable for home use, comprises the use of a pipe having an inlet for the passage of shredded tobacco from a bin to an outlet end of the pipe. A ram is disposed for reciprocation in the pipe to pump the tobacco from the inlet to the outlet end. A larger pipe surrounds the outlet end of the first pipe and overlaps it, forming with it an annular space for receiving an elongated strip of cigarette paper curled transversely in the shape of a tube. Means are provided for



sealing the longitudinal ends of the paper tube in the space. The tube receives shredded tobacco as it is pumped through the outlet end of the first pipe and is moved forward by the deposit of successive amounts of tobacco in the tube. The resulting tobacco-filled tube emerges from the second pipe continuously and a portion of any length can be cut off, such as that corresponding to a regular, a king size, or a super king size cigarette.

3,646,943

RECONSTITUTED TOBACCO

Donald Joseph Blewitt, Richmond, Va., and Otto Karl Schmidt, Wapping, Conn., assignors to AMF Incorporated

Filed Sept. 23, 1968, Ser. No. 761,789

Int. Cl. A24b *03/14*

U.S. Cl. 131—140 C **18 Claims**

A method of making reconstituted tobacco material from stem material is disclosed which involves mechanically working by crushing or flattening stem particles, before it is subjected to any soaking or wetting operation, in such wise that the cellular structure of the stem material is disrupted without significant reduction in the size of the particles. The thus treated material is then refined, mixed with an aqueous carrier to form a slurry, shaped and then dried to a predetermined moisture level. Subsequent to the mechanical working operation, the stem material may be sweated to expand the cellular structure.

3,646,944

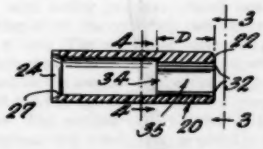
DISPOSABLE RECESSED CIGARETTE TIP

Joseph A. Banoczi, 82 West Avenue, Dorien, Conn.

Filed Feb. 12, 1970, Ser. No. 10,916

Int. Cl. A24f *13/02*

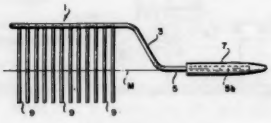
U.S. Cl. 131—187 **4 Claims**



The disclosure describes tubular nonfiltered, disposable mouthpieces for filter tip cigarettes. Each mouthpiece is cylindrical, tapered, or partially cylindrical and tapered in form, and molded of thin, plastic material. Inside each disposable mouthpiece is a plurality of projections against which the flat end of the filter of a cigarette will abut. Abutment ends of the projections are spaced from the rounded outlet end of the mouthpiece and the flat end of the cigarette

so as to define a disposable recessed tip. This thin walled tip in an adapter which converts a regular cigarette, filtered or unfiltered into a recessed tip cigarette.

3,646,945
STYLING COMB AND METHOD OF MAKING
Anthony R. Romani, R.D. #2 A.C. #36, Hollidaysburg, Pa.
Filed Mar. 1, 1971, Ser. No. 119,562
Int. Cl. A45d *24/00*
U.S. Cl. 132—11 6 Claims



A styling comb for styling human hair is comprised of a U-shaped tooth carrier and U-shaped teeth formed of metal for strength, the teeth are inserted between the parallel legs of the U-shaped carrier and welded thereto, a handle is affixed to the free ends of the tooth carrier.

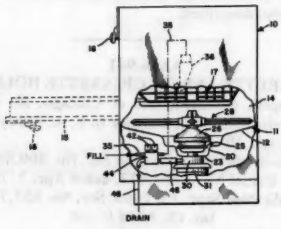
3,646,946
COPPER ALLOY CLEANING PROCESS
James A. Ford, North Haven; Stuart R. Saunders, Branford; Elmer J. Caule, New Haven, all of Conn., and Charles D. McLain, Alton, Ill., assignors to Olin Mathieson Chemical Corporation
Filed Jan. 6, 1969, Ser. No. 789,417
Int. Cl. C23g *1/04*; C24g *1/10*; C23g *1/20*
U.S. Cl. 134—3 12 Claims

A process for removing surface oxides from copper alloys. For example, these alloys which form, on annealing, Al_2O_3 and related oxides are uniquely cleaned by a process which consists of a duplex treatment requiring a first immersion in a hot alkaline solution followed by a second immersion in a hot mineral acid solution.

3,646,947
JACKET PILE CLEANOUT APPARATUS
William R. Rochelle, Houston, Tex., and Ronald Lee Wycoff, Rolla, Mo., assignors to Brown & Root, Inc., Houston, Tex.
Original application Apr. 4, 1969, Ser. No. 813,479, now Patent No. 3,597,930, dated Aug. 10, 1971. Divided and this application June 12, 1970, Ser. No. 57,860
Int. Cl. B08b *3/02*, *9/02*
U.S. Cl. 134—167 C 12 Claims

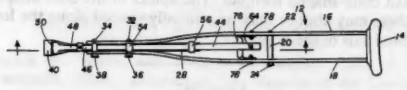
A jacket pile cleanout device for cleaning in situ the interior of an offshore piling including a fluid accumulation jetting chamber for accumulating and jetting a fluid against debris within the interior of a pile casing and a pumping chamber connected with the accumulation chamber. The pumping chamber is fashioned with a fluid inlet and fluid exit with a means for introducing pressurized gas into the interior of the pumping chamber between the fluid inlet and the fluid exit. The pump serves to lift fluid and fragmented matter within the piling to the surface by a gas lift.

3,646,948
HYDRAULIC CONTROL SYSTEM FOR A WASHING MACHINE
Stuart E. Athey, Troy, Ohio, assignor to The Hobart Manufacturing Company, Troy, Ohio
Continuation-in-part of application Ser. No. 789,296, Jan. 6, 1969, now abandoned. This application Sept. 14, 1970, Ser. No. 72,039
Int. Cl. B08b *3/02*
U.S. Cl. 134—57 D 4 Claims



A dishwashing machine has two solenoid actuated fill valves within a water supply line, and pressure tap between the solenoid valves is connected to a normally closed pressure actuated drain valve within a drain line to provide for controlling the drain valve in response to selective actuation of the fill valves. The fill valves are controlled by a timer according to a predetermined sequence, and the downstream fill valve is also actuated by a centrifugal switch responsive to operation of the motor for the recirculating means.

3,646,949
CRUTCH WITH RETRACTABLE ICE GRIPPER
Maurice W. Streeter, 268 E. Muskegon Street, Cedar Springs, Mich.
Filed May 22, 1970, Ser. No. 39,718
Int. Cl. A61h *3/02*
U.S. Cl. 135—58 12 Claims

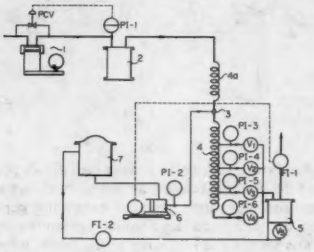


A crutch having a retractable ice gripper operable by the user as he normally uses the crutch while being supported by the crutch. The ice gripper is fixed on the end on an adjustable longitudinal support which is biased downwardly with respect to the crutch with an adjustable biasing means. A latch controls the disposition of the ice gripper with respect to the bottom of the crutch.

3,646,950
METHOD OF REDUCING PRESSURE AND CONTROLLING FLOW RATE OF A FLUID UNDER HIGH PRESSURE

Masaaki Takehisa; Waichiro Kawakami; Hayato Nakajima, all of Takasaki-shi, and Yoshihiko Hosaki, Yokohama-shi, all of Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan

Filed Apr. 1, 1969, Ser. No. 812,247
Claims priority, application Japan, Apr. 12, 1968, 43/24010
Int. Cl. F17d *1/16*
U.S. Cl. 137—13 16 Claims

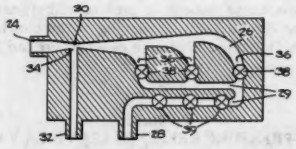


The pressure of a fluid under high pressure can be reduced as the flow rate of said fluid is kept at an arbitrarily selected value by passing said fluid through a circuit comprising a long tubing or a reduction nozzle or series of nozzles and introducing a flow rate controlling medium into said circuit.

3,646,951
FLUIDIC DEVICES WITH A NEGATIVE PRESSURE GENERATING VENTURI

Albert A. Gagne, Huntington, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Apr. 24, 1970, Ser. No. 31,566
Int. Cl. F15c *3/00*, *1/10*
U.S. Cl. 137—81.5 6 Claims



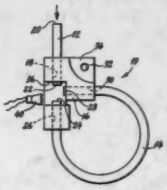
Fluidic devices having a fluid inlet, first and second fluid passages having outlets, means for generating a negative pressure in reference to atmospheric pressure at the second fluid passage as fluid passes through the first fluid passage outlet. The first fluid passage outlet is provided with valves to divert the flow of fluid from the first to the second fluid passage.

3,646,952
FLUID OSCILLATOR

John M. Hunter, Granby, Conn., assignor to Chandler Evans Inc., West Hartford, Conn.

Filed Dec. 29, 1969, Ser. No. 888,456
Int. Cl. F15c *1/04*, *3/00*
U.S. Cl. 137—81.5 8 Claims

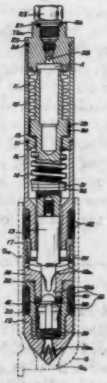
A fluid oscillator comprised of a first conduit which emits a power jet of fluid and a second conduit which both receives the emitted jet and intermittently deflects the emitted jet with fluid pulses to sustain continuous pressure fluctuations within the second conduit. The oscillator can be used as a temperature sensor since the pulse rate of the pressure fluctuations in the second conduit is a measure of the temperature of the fluid transmitted therethrough, other factors being held constant.



3,646,953
GAS LIFT APPARATUS

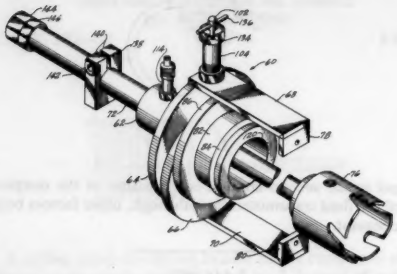
James Kelly Elliott, Baytown, and Douglas W. Crawford, Houston, both of Tex., assignors to Macco Oil Tool Co., Inc., Houston, Tex.

Filed Apr. 6, 1970, Ser. No. 25,985
Int. Cl. F04f *1/20*
U.S. Cl. 137—155 9 Claims



A casing pressured operated, variable orifice valve is employed as the operating valve in a single point injection well assembly with tubing pressure (fluid) operated unloading valves acting above the operating valve to provide a continuous flow system. The operating valve includes a throttling range which extends between optimum injection gas pressure levels based on the amount of injection gas pressure available at the well head to thereby increase the overall efficiency of the system. The variable orifice valve includes a pressure charged bellows and a coil spring in series to produce a linear resultant load rate which in turn cooperates with contoured closure surfaces in the valve to produce a linear relationship between orifice size and injection gas pressure. Gas is thus injected into the production column or tubing at a rate which is linearly related primarily to the casing pressure with the throttling range of the operating valve producing a broad response in the gas injection rate. The injection rate is surface regulated by controlling the injection gas pressure at the wellhead.

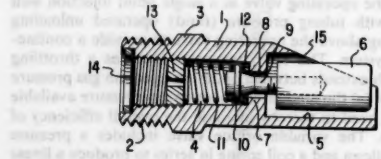
3,646,954
SERVICE TAP TOOL
Walter C. Hutton, 1567 Waldran Avenue, Los Angeles, Calif.
Filed Oct. 28, 1970, Ser. No. 84,784
Int. Cl. F16k *43/00*
U.S. Cl. 137—318 16 Claims



A plug section of a body is adapted to be received in the bore of a coupling of a branch connection from a plastic main containing gas under pressure. An O-ring on this plug section cooperates with the wall of the bore of the coupling to effect a seal. Rotation of a cam follower on a cam of the body brings a locking arm in behind a shoulder of the coupling. Air, admitted through a valve carried by the body, forces the arm into secure engagement with the shoulder of the coupling to secure the tool for making a tap. A boring bar, slidably received in a bore of the body, carries a shell cutter which is used to tap the main.

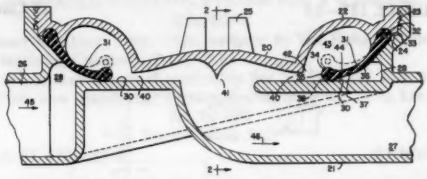
For heavy-duty service, two locking arms, each carried by a different cam follower on different cams of the body, are adapted to engage the shoulder of a coupling 180° apart from one another. The high points of the cams are 180° from each other and have a rise sufficient for the locking arms to clear the coupling when inserting the plug section into the bore of the coupling. The 180° rotation of the followers brings the locking arms radially inward behind the shoulder of the coupling. A detent lock secures the followers together in this closed position.

3,646,955
WATER-FEEDING DEVICE
Jarl Rune Olde, Vardsatravagen 71,750, 10 Uppsala, Sweden
Filed May 6, 1970, Ser. No. 35,072
Claims priority, application Sweden, May 8, 1969, 6550/69
Int. Cl. A01k *07/00*
U.S. Cl. 137—382 8 Claims



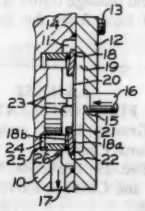
A device for connection to a liquid supply system has a valve mechanism defining an open position for permitting liquid flow and a closed position shutting off liquid flow. An actuator member is operably connected to the valve mechanism for moving the valve mechanism from its closed position into its open position. A protecting lip is connected to the valve mechanism and arranged to at least partially surround the actuator member to prevent the valve mechanism from being inadvertently operated.

3,646,956
RADIAL FLOW CHECK VALVE
Adair Rogers, Harts Lane, Conshohocken, Pa.
Filed Mar. 18, 1970, Ser. No. 20,536
Int. Cl. F16k *15/14*
U.S. Cl. 137—525 14 Claims



A radial flow check valve having radially displaced annular inlet and discharge passages, an annular sealing wall between the inlet and discharge passages extending generally transverse to the axis, and an annular symmetrical elastomeric membrane secured at one edge to the body, when closed engaging the sealing wall at the other and movable edge of the membrane, and separating the inlet and discharge passages, having a web intermediate between its ends which in cross section is convex on the side toward the inlet passage, the movable edge of the membrane opening away from the sealing wall in a generally axial direction. In the preferred form the membrane has at the movable edge an annular lip extending toward the discharge passage and which may contain a metallic support ring. Also in the preferred form there is an annular vortex pocket located adjoining the side of the membrane which exerts closing force, the vortex pocket connecting at one side with the discharge passage by an annular opening, and the discharge passage extending directly from the space between the movable edge of the membrane and the sealing wall when the membrane is open. In the preferred form the membrane at rest conforms to the position which it assumes when the check valve is closed. The membrane may be clamped between separate parts of the body. In axial length the discharge passage is preferably between 0.5 and 1.5 times the distance of full opening of the check valve. In one form, the inlet and discharge passages are led from axial connecting passages.

3,646,957
HIGH-PRESSURE RELIEF BELLEVILLE VALVE
Thomas E. Allen, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed Apr. 22, 1970, Ser. No. 30,679
Int. Cl. F16k *15/14*
U.S. Cl. 137—525 7 Claims



A high-pressure relief valve is constructed of a Belleville-type spring washer preloaded in a housing to serve as a

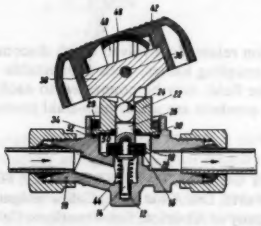
resilient barrier to fluid flow between inlet and outlet openings in the housing. Means are provided for reducing the pressure effect of the fluid on the washer to thereby increase the pressure required to actuate the valve. This is accomplished by reducing the area of effective pressure on the face of the washer.

3,646,958

QUICK-ACTING VALVE WITH ROCKER-TYPE OPERATING BUTTON

Alfred Braas, Dillenburg, Germany, assignor to Armaturenwerk Niederscheld GmbH, Dillenburg/Hessen, Germany

Filed Sept. 22, 1969, Ser. No. 859,647
Int. Cl. F16k *37/00, 31/44*
U.S. Cl. 137—553 **3 Claims**



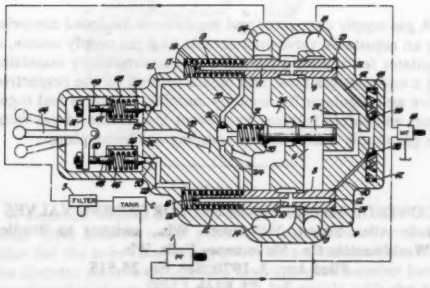
A spring, preferably additionally connected to a ball, is interposed in the motion transfer mechanism from a rocker-type operating button to the valve element of a quick-acting valve, the spring compensating for overtravel during operation and for manufacturing tolerances, to effect tight seating of the valve element while permitting rapid operation of the valve element.

3,646,959

POWER TRANSMISSION

Donald C. Connett, Huntington; Gerald N. Olsen, Torrance, both of Calif., and Kurt R. Lonnemo, Troy, Mich., assignors to Sperry Rand Corporation, Troy, Mich.

Filed Oct. 12, 1970, Ser. No. 79,782
Int. Cl. F16k *11/10*
U.S. Cl. 137—596.12 **6 Claims**



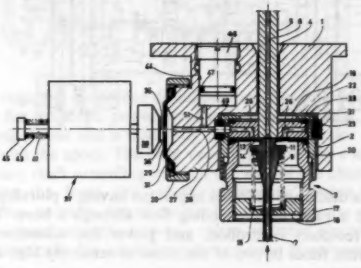
A pressure-modulating directional control valve for high-inertia loads such as the swing drive of a crane uses two three-way spool valves biased to inlet-open position and a separate pressure-regulating valve with a minimum spring bias and a manually variable hydraulic bias. Each three-way valve has a variable pilot pressure relief valve and these are alternately operable by a manual lever to modulate pilot biasing pressure applied to the pressure-regulating valve and also to one or the other of the three-way valves whenever it is acting as a brake valve in the return side of the circuit during motor overrun.

3,646,960

INJECTION AND DOSING ARRANGEMENTS

Kjell Esbjorn Jidling, Spanga, and Lars O. A. Soderkvist, Vallingby, both of Sweden, assignors to LKB-Produkter AB, Bromma, Sweden

Filed Mar. 30, 1970, Ser. No. 23,716
Claims priority, application Sweden, Apr. 25, 1969, 5949/69
Int. Cl. C02d *11/00*
U.S. Cl. 137—565 **6 Claims**



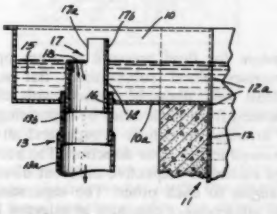
An arrangement for injecting a defined volume of a first fluid into a second streaming fluid is provided. The injection is carried out by separating two normally sealed tube sections through which the streaming fluid passes. The fluid to be injected is supplied to a chamber which surrounds the junction of the sections. An overpressure is obtained in the chamber, the overpressure generating an axial force which separates the sections and opens a passage through which the fluid is injected.

3,646,961

OVERFLOW STRUCTURE IN ELECTROLYTIC CELL OR THE LIKE

Kent F. Marquardson, 4627 Fortuna Way, Salt Lake County, Utah

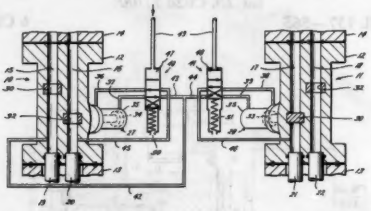
Filed Mar. 25, 1970, Ser. No. 22,438
Int. Cl. F16t *1/00*
U.S. Cl. 137—577 **7 Claims**



An upstanding, tubular riser serves as a discharge pipe for electrolyte overflowing thereinto from a surrounding body of electrolyte. The top of the riser is indented around approximately a semicircle in the form of a notch having an elongate bottom that determines the overflow level of the body of electrolyte. The elongate bottom of the notch preferably extends horizontally around the entire width of the notch, with

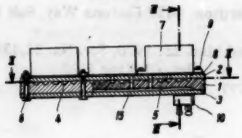
the sides of the notch extending vertically. The notched top portion of the riser is preferably a separate, relatively short nipple telescopically connected to the remainder of the riser.

3,646,962
REMOTELY LOCATED APPARATUS FOR PRODUCING WELL FLUIDS
Marvin R. Jones, Houston, Tex., assignor to Cameron Iron Works, Inc., Houston, Tex.
Filed Oct. 16, 1970, Ser. No. 81,469
Int. Cl. F16k 31/42
U.S. Cl. 137—594 5 Claims



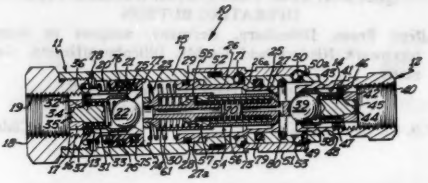
There is disclosed wellhead apparatus having a plurality of bores and a valve for controlling flow through a bore. The valve is remotely controlled, and power for actuation is derived from fluids in two of the bores at relatively high and low pressures.

3,646,963
DUCT SYSTEM FOR FLUID PRESSURE MEDIUM OPERATED REGULATING, CONTROL AND MEASURING APPARATUS
Gerhard Klee, Frankfurt/M.-Ginnheim, Germany, assignor to Samson-Apparatebau A.G., Frankfurt/Main, Germany
Filed Dec. 10, 1969, Ser. No. 883,743
Claims priority, application Germany, Apr. 5, 1969, P 19 17 727.6
Int. Cl. F17d 1/00
U.S. Cl. 137—608 5 Claims



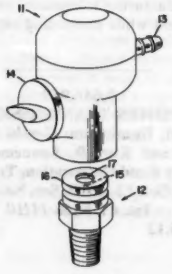
A duct system for fluid pressure medium operated apparatus comprises plural substantially flat superposable plates. At least one plate is formed with channel-type recesses separated from each other by separating walls. The recesses are arranged in regular groups, and all recesses in each group extend in the same direction. The recesses in adjacent groups extend in respective different directions, such as at right angles to each other. The separating walls are pierceable to interconnect channels at selected locations to form a fluid pressure medium flow circuit. In one embodiment of the invention, the plate has channel-type recesses on both surfaces, with the recesses on one surface extending substantially perpendicularly to the recesses on the other surface and with interconnection being effected by aperturing the portion of the plate separating the recesses on the opposite surfaces. In another embodiment of the invention, the recesses are formed on only one surface of the plate, and the separating walls comprise webs of the channel-type recesses.

3,646,964
COUPLING DEVICE FOR PERMITTING COUPLING UNDER TRAPPED PRESSURE
Paul E. Stratman, Minneapolis, Minn., assignor to Parker-Hannifin Corporation, Cleveland, Ohio
Filed Feb. 28, 1967, Ser. No. 619,239
Int. Cl. F16l 37/28
U.S. Cl. 137—614.03 28 Claims



This invention relates to a valved quick disconnect coupler in which two coupling halves, each connectable to a respective conduit for fluid, may be connected to each other while either or both conduits are under high-fluid pressure.

3,646,965
GAS SUPPLY CONNECTOR AND REGULATOR VALVE
Leonard B. Swartz, Los Altos Hills, Calif., assignor to Oxygen Valve Company of America, San Francisco, Calif.
Filed Jan. 23, 1968, Ser. No. 699,866
Int. Cl. F16k 29/00
U.S. Cl. 137—614.06 12 Claims

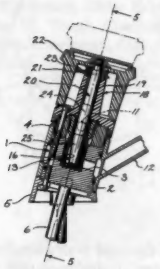


A gas supply connector and regulator is disclosed comprising an adjustable valve connectable to a gas supply source, a regulator for adjusting the valve and automatically maintaining a constant gas flow, and means formed on the respective valve and regulator for securely coupling the valve and regulator, and safety features to prevent the release of gas from the gas supply source during coupling and uncoupling.

3,646,966
CONTROL MEMBER FOR PROPORTIONING VALVES
Edwin Allen Smart, Milwaukee, Wis., assignor to Bradley Washfountain Co., Menomonee Falls, Wis.
Filed Apr. 3, 1970, Ser. No. 25,515
Int. Cl. F16k 11/00
U.S. Cl. 137—625.4 4 Claims

There is shown a proportioning valve for controlling the mixing of two fluids. A valve body with an internal recess has a pair of diametrically opposed inlet ports and an outlet that connects with a discharge spout. A sleeve is inserted in the recess which has deflectable sealing cushions directly in front of the inlet ports, and an elongate control rod is inserted

within the sleeve which is movable both in axially and circumferential directions. The control rod has a cylindrical portion which squeezes the sealing cushions of the sleeve into port closing positions, and a tapered portion canted at an angle which when moved into alignment with the inlet ports controls the relative amounts of flow from the two ports in



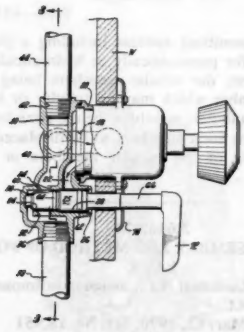
response to rotation of the control rod. The tapered portion has a lobe extending along a substantial length of the rod to present a radial protrusion, such that when the control rod is adjusted to have flow from one inlet port and no flow from the other the closing pressure against the sealing cushion of the closed port is augmented.

3,646,967

DIVERTER VALVE STRUCTURE

Louis E. Ross, Sunland; John K. Lyon, Pasadena, and Julius J. Paolucci, Canoga Park, all of Calif., assignors to Price-Pfister Brass Mfg. Co., Pacoima, Calif.

Filed Apr. 6, 1970, Ser. No. 25,632
Int. Cl. F16k *11/00*
U.S. Cl. 137—625.47 **8 Claims**



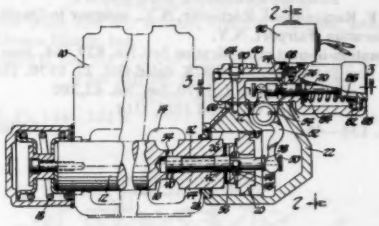
A common casting provides hot and cold water inlets to a mixer valve and two outlet ports, one for the shower and the other for the tub. The casting provides a chamber for a hollow diverter valve member. The diverter valve member has a lateral outlet at one end registrable selectively with the tub and shower ports. An inlet to the interior of the hollow diverter valve member is formed at the other end. Peripheral O-rings on opposite sides of the inlet provide a seal. These O-rings are located in eccentric grooves so that a lateral thrust is imposed on the diverter valve member. The thrust seals the lateral outlet and prevents undesired flow to the opposite outlet port.

3,646,968

POWER TRANSMISSION VALVE WITH DETENT

Carl R. Binkley, Warren, and Robert G. Farrell, Royal Oak, both of Mich., assignors to Sperry Rand Corporation, Troy, Mich.

Filed Sept. 30, 1970, Ser. No. 76,890
Int. Cl. F16k *11/07, 31/44*
U.S. Cl. 137—625.64 **7 Claims**



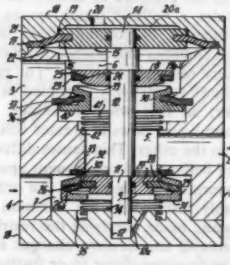
A remotely controlled directional valve of the sliding spool type for hydraulic power systems has a differential area actuating piston and a three-way followup pilot valve concentric with the spool. The pilot valve is actuated by a lever and a rotary shaft extending through the wall of the chamber enclosing the large side of the differential piston. A cap member provides detent means for the pilot valve together with interchangeable two-way valves actuated electrically or pneumatically for admitting pilot pressure to release the detents.

3,646,969

VALVE MECHANISM

Harald Stampfli, Petit-Saconnex, Switzerland, assignor to Lucifer S.A., Carouge-Geneva, Switzerland

Filed Mar. 23, 1970, Ser. No. 21,723
Claims priority, application Switzerland, Apr. 22, 1969, 6037/69
Int. Cl. F16k *11/04*
U.S. Cl. 137—627.5 **4 Claims**



A valve mechanism including a movable system carrying two valve members closing selectively two channels through engagement with their seats, at least one valve member being carried floatingly by a spring with the interposition of a rigid member fitted over the outer peripheral deformable edge of an intermediate yielding washer or the like member engaging through its inner peripheral edge the valve member considered. Similarly the seat of another valve member may be carried floatingly by a spring and form a rigid annular member fitted over the inner deformable edge of an intermediate yielding washer or the like member engaging through its outer peripheral edge the inner surface of the body of the valve mechanism. In all cases, the two valve members are held both in their closed condition for an intermediate position between the open positions of either valve member. Thus, an annular yielding member fitted coaxially

in a rigid member subjected to the action of a spring engages fluidtightly through said yielding member a valve member or a seat for the latter according to the case, whereby said spring urges the rigid member into engagement with the cooperating seat or cooperating valve member respectively.

3,646,970

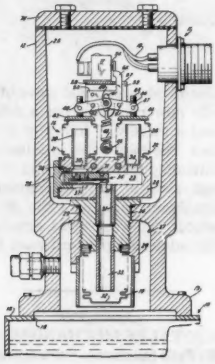
FLOW CONTROL UNIT FOR BELLOWS CONTROLLED SUDDEN PRESSURE RISE RELAY

Robert F. Romanowski, Rochester, N.Y., assignor to Qualitrol Corporation, Fairport, N.Y.

Continuation-in-part of application Ser. No. 829,464, June 2, 1969, now Patent No. 3,535,878, dated Oct. 27, 1970. This application June 1, 1970, Ser. No. 42,280

Int. Cl. F15d *1/02, 1/14*

U.S. Cl. 138—46 **3 Claims**



A relay unit designed for association with a fluid cooled transformer apparatus. The relay acts by means of a hydraulic bellows system to sense internal pressure variations in a tank member of the transformer apparatus; and it responds to a sudden rise in the pressure to actuate an alarm switch. The system includes a bellows which senses the pressure variation, and responds by forcing liquid in the system through a common chamber and connecting passages to each to a pair of pressure responsive bellows. The passage to one of the pair of bellows is relatively restricted as compared to that to the other, so that when a sudden pressure rise develops the system liquid flows in greater volume to one of the bellows than to the other. This causes differential expansion of the pair of bellows and consequent upsetting of linkage controlling operation of the switch. An orifice flow control unit removably inserted in the common chamber includes a thermostatic blade overlying the restricted passage. The blade responds to temperature changes in the bellows system liquid so as to move closer to or further clear of the restricted passage. In this manner, it serves to regulate and to maintain a constant rate of flow of the system liquid through the restricted passage over an operating range of −40° to 100° C.

3,646,971

DUCT FOR THE TRANSFER OF MATERIALS AT A VARIABLE FLOW RATE

Jean Godet, Le Mans, France, assignor to Service d'Exploitation Industrielle des Tabacs et des Allumettes, Paris, France

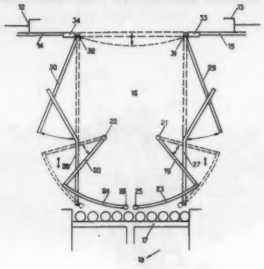
Filed June 30, 1969, Ser. No. 837,566

Claims priority, application France, July 2, 1969, 157474

Int. Cl. B65d *83/02*

U.S. Cl. 138—46 **9 Claims**

Duct for transferring a stream of material from a feed unit to a receiving unit, comprising means for adapting at least a part of the cross section of the said duct to the flow of the material streaming through said duct, the said means consisting of at least two wall elements which are mounted on the opposite sides of a lateral opening in one wall of the said



duct, at least one of the said wall elements being movable, said wall elements being so designed that the distance, over which said movable wall element is in contact with the material, varies according to the position of the said element during the displacements thereof.

3,646,972

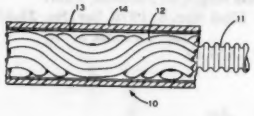
MULTITUBING SYSTEM

Hubert Kuypers, Bad Nenndorf, Germany, assignor to Kabel- und Metallwerke Gutehoffnungshutte Aktiengesellschaft, Hannover, Germany

Filed Feb. 27, 1970, Ser. No. 15,008

Int. Cl. F16l *9/18, 11/12*

U.S. Cl. 138—111 **8 Claims**



Information transmitting systems including a plurality of tubular members for pneumatically or hydraulically passing data in pulse form; the tubular members being stranded about a core member which may be tubular or in electric cable form, the tubular members being stranded with a reverse lay to allow such members to be displaced to allow convenient tapping of the tubular members or the core member.

3,646,973

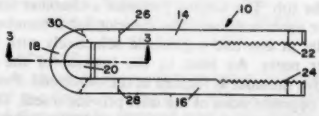
LUG STRAP ASSEMBLY AND METHOD OF FORMING SAME

Coyt E. Murray, Gastonia, N.C., assignor to Impact Plastics, Inc., Gastonia, N.C.

Filed Mar. 12, 1970, Ser. No. 18,951

Int. Cl. D03d *49/40*

U.S. Cl. 139—153 **4 Claims**



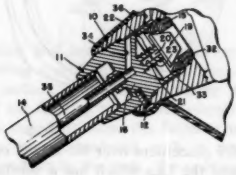
Slots provided along substantially the entire lengths of the leg and web portions of the strap component increase its flex-

ibility, facilitate the heat dissipation and/or provide a seat for a removable plug component. Bending of the strap into its U-shaped configuration, formation of the web slot and seating of the plug may be achieved in one operation.

3,646,974
AUTOMATIC SHUTOFF DISPENSING NOZZLE VENTURI

Glenn E. Moore, Cincinnati, Ohio; Fred A. Wilson, Florence, Ky., and Chester W. Wood, Cincinnati, Ohio, assignors to Dover Corporation, Cincinnati, Ohio

Filed Mar. 23, 1970, Ser. No. 21,618
Int. Cl. B67d *5/373*
U.S. Cl. 141—392 **10 Claims**

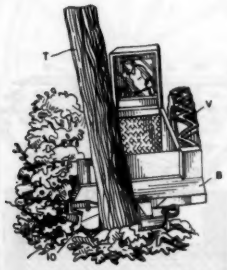


A continuous groove is formed in the conical bore of a variable venturi body to increase the area in which the liquid flowing therethrough can expand to produce an enlarged low-pressure area. This enlarged low-pressure area enables a diaphragm to be moved to close a main valve even when the flow rate through the venturi is as low as one gallon per minute.

3,646,975
TREE SHEARING APPARATUS

Donald J. McNeil, Sr., Portland, and Richard R. Deline, West Linn, both of Oreg., assignors to Esco Corporation, Portland, Oreg.

Filed Aug. 22, 1969, Ser. No. 852,423
Int. Cl. A01g *23/02*
U.S. Cl. 144—34 E **16 Claims**

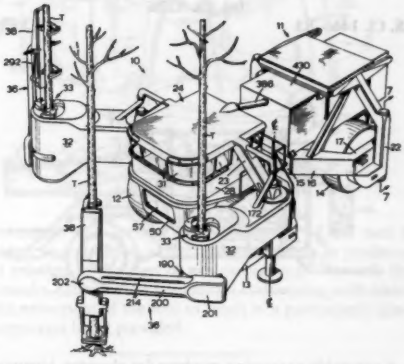


An apparatus for shearing trees which is relatively compact and lightweight and which may be easily attached to a blade of a tractor, a log skidder, a boom, or other device. The apparatus includes a generally L-shaped body with a relatively thin, platelike blade slidably mounted thereon. Hydraulic pistons are mounted within the body for pushing the cutting edge of the blade toward the base of the L-shaped body, and a stationary anvil knife is attached to the base. The blade is shaped to cut the tree fibers closest to the operator first to assist in directional fall, and the upper surface of the blade may carry wedges for further assisting directional felling. The outer periphery the blade theblade is provided with an upstanding rim for pulling hung-up trees after they are severed. The apparatus may be pivotally secured to a vehicle, and the rear side of the body is provided with an arcuate blade member for log-decking or blading operations when the apparatus is pivoted into a raised position.

3,646,976
TREE GRASPING DEVICE

Bruce John McColl, Whitby, Ontario, Canada, assignor to Owens-Illinois, Inc.

Division of Ser. No. 572,530, Aug. 15, 1966, Pat. No. 3,533,458
Filed July 30, 1970, Ser. No. 59,388
Int. Cl. A01g *23/02*
U.S. Cl. 144—242 R **2 Claims**

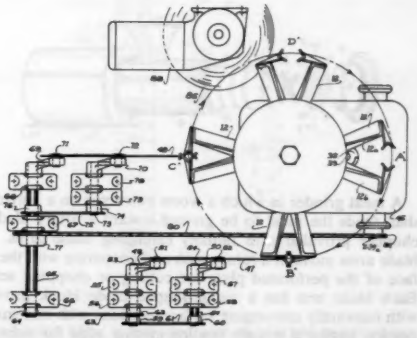


A tree grasping mechanism for a tree harvester in which two grasping arms are mounted for pivotal movement on a slide that is mounted for reciprocable movement on a support structure of the tree harvester.

3,646,977
BROCCOLI TRIMMING MACHINE

Richard J. Goodale, Watsonville, Calif., assignor to Goodale Manufacturing Company, Inc., Watsonville, Calif.

Filed Apr. 27, 1970, Ser. No. 32,088
Int. Cl. A23n *15/04;* **B26d** *3/26*
U.S. Cl. 146—78 R **10 Claims**



A broccoli trimming machine that is provided with a rotatable mechanism having a plurality of broccoli gripping means adapted to be rotated past a plurality of stations in-

cluding a loading station A, a first slitting station B, a second slitting station C and a discharge station D. The broccoli gripping means are rotated past these stations in step-by-step motion by a Geneva-type drive. The slitting knives are attached to an endless chain which moves the knives in predetermined orbits. The broccoli gripping devices are closed by a system of cams while each broccoli gripping device is at the loading station. Rotating the broccoli gripping devices past the stations as well as opening and closing the gripping devices and moving the knives through their orbits is accomplished by a suitable drive mechanism in timed relation.

3,646,978

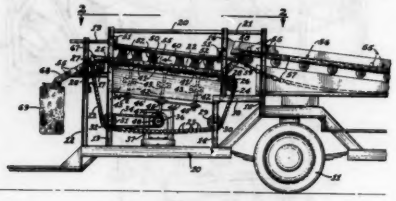
VEGETABLE PROCESSING MACHINE

Thomas Tait, 3920 West Rancho Drive, Phoenix, Ariz.

Filed Sept. 2, 1969, Ser. No. 854,533

Int. Cl. A23n

U.S. Cl. 146—83 **3 Claims**



A vegetable processing machine for cleaning, trimming off the tops and roots, and bagging of vegetables such as onions and the like.

3,646,979

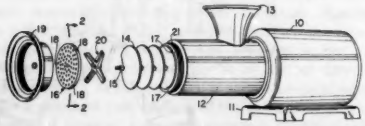
ROTARY BLADE FOR MEAT GRINDER

Eugene A. Anderson, Lewis Place, Box 895, Douglasville, Ga.

Continuation-in-part of application Ser. No. 764,407, Oct. 2, 1968, now Patent No. 3,563,291. This application July 1, 1970, Ser. No. 51,645

Int. Cl. B02c *18/36*

U.S. Cl. 146—189 A **11 Claims**



A meat grinder in which a worm conveyor on a horizontal shaft feeds the meat to be ground toward a rotary blade or chopper provided with radially extending blade arms. The blade arms move in a rotary path and cooperate with the surface of the perforated plate for cutting or chopping action. Each blade arm has a wedge-shaped blade block provided with outwardly converging surface portions with one surface portion having a straight leading cutting edge for riding on the surface of the plate. This cutting edge is disposed forwardly of and substantially parallel to the radial axis of the blade arm. The wedge-shaped blade blocks assure even wearing of the blade blocks against the plate.

3,646,980

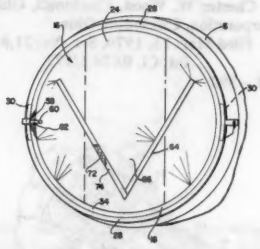
JET ENGINE COWL COVER

Fred D. Peterson, Belmont, Calif., assignor to Peterson Products of San Mateo, Inc., Belmont, Calif.

Filed June 15, 1970, Ser. No. 46,071

Int. Cl. B65d *65/02*

U.S. Cl. 150—52 R **14 Claims**



A cowl cover for placement over the intake opening of jet engine nacelles and the like which has a substantially rigid, lightweight outer ring constructed to fit into the opening and which includes stop means limiting the inward movement of the ring into the nacelle. The periphery of a translucent plastic sheet is tautly secured to the ring to close the nacelle opening when the ring is in place. The exterior surface of the ring includes a gasket that seals the ring to the nacelle and which applies a releasable force biasing the cowl cover against the nacelle. The plastic sheet includes a V-shaped slit so that a center portion of the sheet can be opened to provide access into the nacelle interior through the sheet and which can, thereafter, be closed to protect the nacelle interior from the atmosphere and atmospheric contaminants.

3,646,981

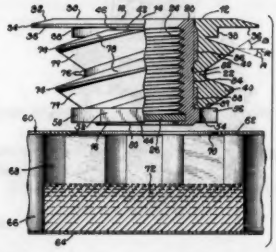
INSERT FOR SANDWICH PANELS

Gerald Barnes, Brooklyn, N.Y., assignor to Amerace Esna Corporation, New York, N.Y.

Filed June 2, 1970, Ser. No. 42,824

Int. Cl. F16b *35/00, 41/00*

U.S. Cl. 151—41.7 **5 Claims**



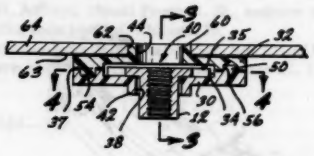
A threaded insert is affixed within a sandwich panel with a hardenable liquid adhesive which is forced into intimate contact with the body of the insert by helical ribs on the body which move the liquid adhesive during insertion of the insert into the panel and are engaged by the adhesive to anchor the insert upon hardening of the adhesive. The body is a composite construction including a metallic threaded member surrounded by a sleeve of molded plastic which carries the helical ribs.

3,646,982

ENCAPSULATED FLOATING AND NONFLOATING FASTENERS

Kenneth V. Cushman, Santa Ana, Calif., assignor to Deltron Fastener Division of Rex Chainbelt, Inc., Milwaukee, Wis.

Filed Sept. 12, 1969, Ser. No. 857,418
Int. Cl. F16b 41/00
U.S. Cl. 151—41.7 7 Claims



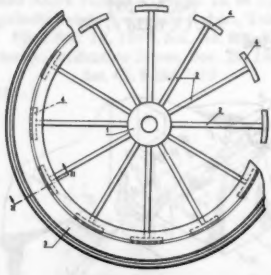
The invention is a fastener having an encapsulating base section providing a relatively large surface area which is attached to a surface by adhesive bonding. In one form the fastener is of the floating type. The fastener has a base section which is caged to allow the fastener to float laterally. The fastener is encapsulated with a portion extending through an aperture in the cage, the encapsulation having a circular rib to register with an opening in a surface to which the cage is secured by adhesive bonding, or sonic vibration.

3,646,983

WHEEL COMPRISING A TIRE OF RUBBER OR SYNTHETIC MATERIAL AND A METHOD FOR MANUFACTURING SAID WHEEL

Leonardus J. M. Van Lieshoud, Maastricht, Netherlands, assignor to N. V. Bataafsche Rubber Industrie "Radium", Maastricht, Netherlands

Filed Dec. 5, 1969, Ser. No. 882,426
Claims priority, application Netherlands, Dec. 12, 1968, 68/17831
Int. Cl. B60c 7/28
U.S. Cl. 152—323 2 Claims



A wheel comprising a tire of elastic material in which the end of each of the spokes or the rim of a disc or plate projecting from the wheel hub is embedded.

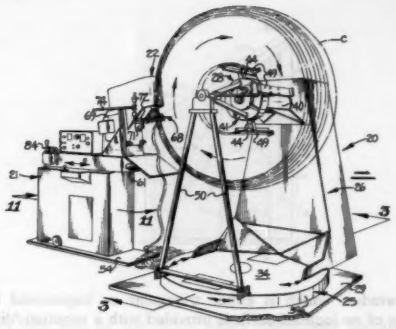
3,646,984

APPARATUS FOR REMOVING A TIRE TREAD

Harvey E. Morgan; Theodore Suttle, both of Salisbury, and Jackson C. Schenck, Rockwell, all of N.C., assignors to Brad Ragan, Inc., Spruce Pine, N.C.

Filed Feb. 4, 1970, Ser. No. 8,514
Int. Cl. B29h 21/08
U.S. Cl. 157—13 7 Claims

Apparatus for preparing a previously used tire carcass for retreading, such as by removal of tread from the circumferential face thereof, wherein a tire carcass is mounted on a tire stand for rotation about horizontal and vertical axes while a tool head support mounts a tool for movement adjacent the tire stand means and for engagement of the tool with a circumferential face of a tire carcass rotating about the horizontal and vertical axes. Movement of the tool is restrained to translation along a line extending in predetermined relation to the axes of tire carcass rotation, with the compound rotation of the tire carcass cooperating with translational movement of the tool to result in a particularly compact apparatus being provided.

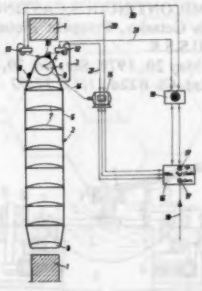


3,646,985

VENETIAN BLIND WITH AUTOMATIC CONTROL OF ROOM BRIGHTNESS

Horst Klann, Bremen, Germany, assignor to Justin Huppe, Kommanditgesellschaft, Oldenburg, Germany

Continuation-in-part of application Ser. No. 792,629, Jan. 21, 1969, now abandoned. This application Apr. 13, 1970, Ser. No. 27,664
Int. Cl. E06b 9/26, 9/30
U.S. Cl. 160—168 2 Claims



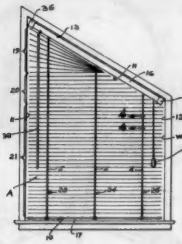
A venetian blind is provided with an electric motor to run the blind up and down. The motor also tips the slats one way or the other automatically to control the amount of light admitted to a room as detected by a control circuit having a photosensitive device in the room.

3,646,986

INCLINED-SOFFIT VENETIAN BLIND AND INSTALLATION

Joseph A. Anderle, Clifton, N.J., assignor to Levolor Lorentzen, Inc., Hoboken, N.J.

Filed May 15, 1970, Ser. No. 37,589
Int. Cl. E06b 9/30
U.S. Cl. 160—168 16 Claims



A window which is either triangular or trapezoidal by reason of an inclined soffit is provided with a venetian blind which controls the passage of light through all portions of the window.

3,646,987

METHOD FOR REDUCING POLLUTION IN FOUNDRIES

Joseph S. Schumacher, Cincinnati, Ohio, assignor to International Minerals and Chemical Corporation, Skokie, Ill.

Continuation-in-part of application Ser. No. 839,339, Apr. 7, 1969, which is a continuation-in-part of application Ser. No. 714,339, Mar. 19, 1968, now Patent No. 3,461,941. This application Oct. 15, 1969, Ser. No. 866,716. The portion of the term of this patent subsequent to Aug. 19, 1986, has been disclaimed.
Int. Cl. B22d 29/00
U.S. Cl. 164—5 9 Claims

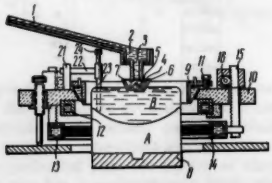
This invention relates to a method for reducing dust pollution in foundries that use sand molds for casting and recycle the used sand for subsequent molding operations. A quantity of sand is added to the used sand, preferably at the shakeout, so that the total amount of said weighs at least 12 times the weight of the metal previously cast.

3,646,988

INDUCTION APPARATUS FOR CONTINUOUS AND SEMICONTINUOUS CASTING

Zinovy Naumovich Getselev, Prospekt Metallurgov, 73, kv. 29, Kuibyshev, U.S.S.R.

Filed May 20, 1970, Ser. No. 39,131
Int. Cl. B22d 11/12, 27/02
U.S. Cl. 164—251 2 Claims



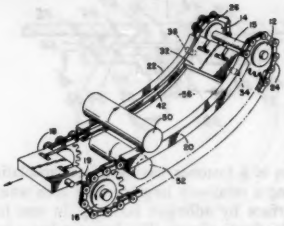
Apparatus for continuous and semicontinuous casting of metals by feeding molten metal into an annular electromagnetic inductor creating a field for forming an ingot cooled by a liquid supplied by a ring device made in the form of a perforated tube and mounted under the inductor so as to be capable of movement in a vertical direction.

3,646,989

CONTINUOUS CASTING DUMMY BAR HEAD CASTING CONVEYOR

Donald L. Lomax, Glen Mills, Pa., assignor to Gulf & Western Industrial Products Company, Grand Rapids, Mich.

Filed June 1, 1970, Ser. No. 41,926
Int. Cl. B22d 11/08
U.S. Cl. 164—274 11 Claims



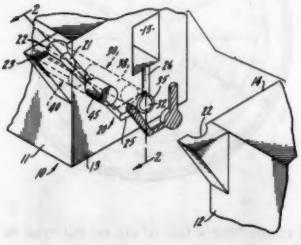
An apparatus for driving and guiding a continuous cast strand from an initial position at an open-ended mold to a second position within a withdrawal roll unit. The apparatus comprises external conveyor means which extend from the mold into the withdrawal unit to drive a dummy bar head from the mold through a predetermined path into the withdrawal unit. The dummy bar head acts as the bottom of the mold at cast startup and becomes integral with the cast strand at pouring. The head is driven by pivot pins extending from the head into coupling engagement with the conveyor means and is automatically released from the conveyor when driving of the cast strand is assumed by the withdrawal unit pinch rolls.

3,646,990

DIE CASTING MACHINE

Raymond E. Cross, 910 N. Green Bay Road, Lake Forest, Ill.

Continuation-in-part of application Ser. No. 769,598, Oct. 22, 1968, now abandoned. This application Oct. 10, 1969, Ser. No. 865,397
Int. Cl. B22d 17/00
U.S. Cl. 164—304 17 Claims



A method of casting high-temperature melting point metals and a die arrangement and molten metal feed mechanism for a die casting machine. The method includes gravity filling a shot cylinder with molten metal, cutting off the inlet to the shot cylinder when it is full and then forcing the molten metal in the air-free cylinder into the mold cavity. The machine includes die elements adapted to mate and define a mold cavity at a parting line defined by parting surfaces between the opposed faces of the elements. The die arrangement and molten metal feed mechanism includes a sprue and runner complex also disposed at a parting line, and a molten metal injection or shot cylinder which extends into the part-

ing plane or lines. The metal shot cylinder is filled through the sprue with the dies closed. In one aspect of the invention, a molten metal injection plunger acts to seal off the sprue from the shot cylinder during a casting operation, while in another aspect of the invention a separate sprue plunger is utilized to perform this function.

3,646,991

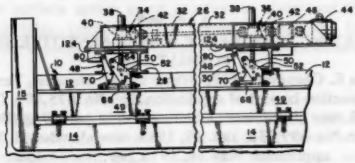
TOP BLOCK SHIFT

Lyman W. Jeffreys, Mount Prospect, Ill., assignor to Armsted Industries Incorporated, Chicago, Ill.

Continuation-in-part of application Ser. No. 731,015, May 22, 1968, now abandoned. This application June 22, 1970, Ser. No. 47,963

Int. Cl. B22d 17/26

U.S. Cl. 164—342 **10 Claims**



In an adjustable slab mold having side, end, top and bottom blocks, a top block shift is connected to a side block and has means to vertically raise and lower the top block and longitudinally move the top block relative to the mold. The top block may be further laterally moved relative to the side blocks.

3,646,992

METHOD FOR HEATING PRESSING PLATES OF CONTINUOUS FLAT PRESS

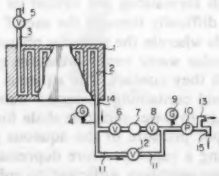
Kazutomo Ishizawa; Yasunori Nagata; Junnosuke Abe, all of Osaka, and Akira Fukuoka, Tokyo, all of Japan, assignors to Kanegafuchi Boseki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 19, 1969, Ser. No. 886,525

Claims priority, application Japan, Dec. 29, 1968, 43/96481

Int. Cl. F28d 7/10

U.S. Cl. 165—1 **2 Claims**



Method for heating pressing plates of a continuous flat press for maintaining surface temperature thereof below 100° C. by utilizing steam. The inside pressure of a conduit disposed in said pressing plate is maintained at a predetermined pressure below an atmospheric pressure while supplying steam into said conduit. And it is preferably applied for carrying out the present method that the partial pressure of air in said conduit is discharged before supplying said steam into said conduit.

3,646,993

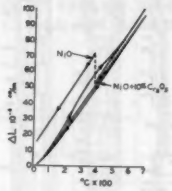
STABILIZED NICKEL OXIDE SEAL

Hal H. Rice, Birmingham, and James J. Dudash, Sterling Heights, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 18, 1970, Ser. No. 38,390

Int. Cl. B05b 7/22

U.S. Cl. 165—9 **5 Claims**



A fluid seal for use in the rotary regenerator portion of a gas turbine engine formed by heating a mixture of NiO and 2½ to 10 percent, by weight, Cr_2O_3 or Fe_3O_4 stabilizing additive to an elevated temperature to cause a reaction therebetween and thereafter plasma spraying the heated mixture on a base member to form a NiO base seal adapted for rubbing contact with the regenerator.

3,646,994

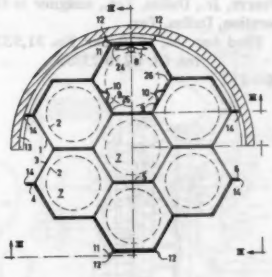
SPACER GRID RESPECTIVELY PLATE SPRING FOR A BUNCH OF CYLINDRICAL ELEMENTS TAKING PART IN A HEAT-EXCHANGING PROCESS

Gijsbrect G. Piepers, Heiloo; Leonard H. Vons; Aart Van Der Linde, both of, Alkmaar, and Edvard Lijbrink, Bergen N. H., all of Netherlands, assignors to Reactor Centrum Nederland, The Hague, Netherlands

Filed Dec. 23, 1969, Ser. No. 887,801

Int. Cl. F28f 7/00

U.S. Cl. 165—69 **10 Claims**



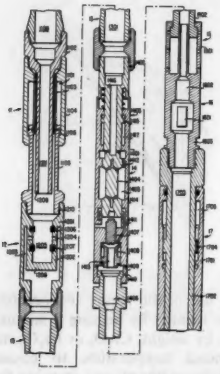
A spacer grid for holding against lateral displacement a plurality of nuclear reactor fuel rods of heat exchange tubes includes means defining a plurality of side-by-side parallel compartments, each compartment being provided with a specially shaped arched spring plate which engages the fuel element or heat exchanger tube. The spring plates are so contoured and apertured as to provide passages for the flow of heat exchange fluid to thereby avoid stagnation of the fluid.

3,646,995

METHOD AND APPARATUS FOR TESTING OFFSHORE WELLS

Dewey K. Manes, Aqoura, Calif.; David L. Farley, and Gary Q. Wray, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Dec. 8, 1969, Ser. No. 882,856
Int. Cl. E21b *47/06*
U.S. Cl. 166—.5 **12 Claims**



Method and apparatus for testing offshore wells where a conduit string connected with a testing string is supported in a wellhead during testing operations and where a combination of gravity responsive means and extensible means effect operation of a testing valve.

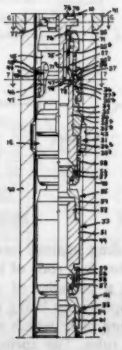
The apparatus includes a testing string containing a series of abutments for supporting an upper portion of the string in the wellhead, slip joint, a safety valve operable in response to the slip joint, drill collars which function as gravity responsive valve actuating means, a testing valve including an hydraulic impedance mechanism, a sample chamber and pressure recorder, a jar tool, a safety joint, and a packer mechanism which serves to anchor the lower portion of the string in a submerged well.

3,646,996

WELL TOOLS

Joseph L. Pearce, Jr., Dallas, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Apr. 24, 1970, Ser. No. 31,533
Int. Cl. E21b *23/00*
U.S. Cl. 166—212 **16 Claims**



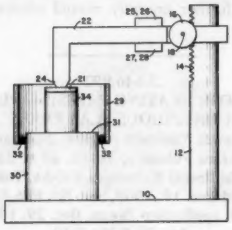
A locking device and a setting tool for setting said locking device in any selected one of a plurality of identical landing nipples having a locking recess and sealing surface therein installed at spaced intervals in a well tubing string to form a part thereof. The setting tool and locking device are attached to a string of operating tools and moved through the well tubing by fluid pressure or by conventional wire line. Locating means on the setting tool is initially held by retaining means in retracted position but is released for movement to expanded position enabling the setting tool to be stopped at an upwardly facing shoulder spaced in said tubing from the lock recess in the selected landing nipple. Longitudinal movement of the operating tools then expands the locking dogs of the locking device into locking engagement with said lock recess of said nipple, and reverse movement of said operating tool string releases said setting tool from said locking device for removal of the setting tool from the tubing string leaving the locking device locked in said landing nipple. Means for releasing the retaining means which is mechanically operated and means which is responsive to hydrostatic pressure are disclosed.

3,646,997

TREATING SUBSURFACE WATER-SENSITIVE SHALE FORMATIONS

Martin E. Chenevert, 5603 Willer's Way, Houston, Tex.

Continuation-in-part of application Ser. No. 675,490, Oct. 16, 1967, now abandoned , Continuation-in-part of application Ser. No. 699,255, Jan. 19, 1968, now abandoned. This application May 14, 1970, Ser. No. 37,432
Int. Cl. E21b *21/04, 47/00*
U.S. Cl. 166—250 **39 Claims**



Shaley earth formations are drilled or otherwise treated with reduced difficulty through the use of water-in-oil invert emulsion fluids wherein the aqueous phases of the emulsions possess particular water vapor pressures relative to the formations which they contact. The aqueous vapor pressure of an oil-base fluid containing dispersed water is controlled to prevent damage to water-sensitive shale formations by monitoring the vapor pressure of the aqueous phase of the fluid and maintaining a vapor pressure depressant in the aqueous phase in a concentration sufficient to substantially prevent the migration of water from the fluid to the formations. The aqueous vapor pressure of an earth formation is determined. A method and apparatus are disclosed for determining the compatibility of a well fluid with a water-sensitive subsurface formation wherein a substantially unaltered sample of the formation is immersed in the fluid and the direction and extent of water migration between the well fluid and the sample are logged. Improved water-in-oil invert emulsion fluid compositions for drilling and other oil fields uses are obtained wherein the aqueous phases of the emulsions possess particular water vapor pressures relative to the formations which they contact.

3,646,998
METHOD AND COMPOSITIONS FOR STABILIZING INCOMPETENT OIL-CONTAINING FORMATIONS

Beverly A. Curtice, and Bobby G. Harnsberger, both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed June 8, 1970, Ser. No. 44,550
Int. Cl. C04b 7/02; E21b 43/02
U.S. Cl. 166—276 12 Claims

Improved method of and compositions for the treatment of an oil-containing incompetent formation to prevent the movement of unconsolidated sand particles in an underground formation by forming a treating composition of sand, cement, silica flour, and a sufficient amount of petroleum oil fraction containing an oil-wetting agent therein to oil-wet the sand, cement, and silica flour particles, suspending the resulting treating composition in an aqueous carrier medium, injecting the aqueous suspension against the unconsolidated formation at a pressure effective to force the treating composition into contact with the unconsolidated formation, contacting the placed treating composition with an aqueous surface active agent solution to water wet the cement particles, permitting the cement to set and form a permeable cement and recovering oil through the cement.

3,646,999
EPOXY RESIN SAND CONSOLIDATION REJUVENATION

Tyler W. Hamby, Jr., Metairie, and William T. Strickland, Jr., New Orleans, both of La., assignors to Shell Oil Company, New York, N.Y.

Filed May 20, 1970, Ser. No. 39,872
Int. Cl. E21b 33/138; E02d 3/14
U.S. Cl. 166—281 10 Claims

A consolidated permeable mass of grains that contains an epoxy resin grain-bonding material that has been weakened by exposure to a resin-degradative aqueous liquid is strengthened and stabilized by contacting the permeable mass with a polyfunctional organic silane capable of functioning as a resin-to-grain bonding agent.

3,647,000
METHOD FOR CONTROLLING WELL BLOWOUTS

Kermit G. Rowley, Houston, Tex., and Richard H. Barron, Lafayette, La., assignors to Tenneco Oil Company, Houston, Tex.

Filed Apr. 16, 1970, Ser. No. 29,091
Int. Cl. E21b 33/035, 35/00
U.S. Cl. 166—285 14 Claims

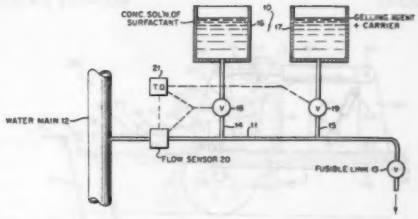
Uncontrolled flow of oil and gas from petroleum wells located in a body of water, is stopped by a procedure performed below the water surface at a location which is free from wave action and is safe from the danger of fire or explosion. An access conduit line is hot-tapped into the production tubing through access windows formed in the well casing. The production tubing is then crimped above the hot tap and solid particles are then introduced into the production tubing through the access line where they are carried upwardly by the flowing well fluids to lodge within the restriction and form a plug. Heavy, noncombustible "mud" is then pumped into the tubing through the access line until the weight of the injected mud overcomes the formation pressure, thus terminating well flow.

Where the well is located on land, the method of the present invention may be practiced by obtaining access t the well structure at the point below the land surface for formation of the hot tap and crimp.

3,647,001
COMBATING FIRE WITH ABLATIVE WATER

William L. Livingston, Norwood, Mass., assignor to Factory Mutual Research Corporation, Boston-Providence Turnpike, Mass.

Filed Apr. 22, 1970, Ser. No. 30,835
Int. Cl. A62c 1/06; A62d 1/00
U.S. Cl. 169—1 A 2 Claims

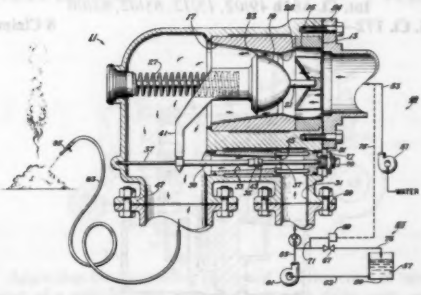


The application of ablative water in combating fire is improved by wetting the surfaces of the combustible materials to be protected with water containing a surfactant prior to the application of ablative water to such surfaces in order that the subsequently applied ablative water readily penetrates the combustible material down to where the fire is in order that the ablative water be available where it is required.

3,647,002
APPARATUS FOR ADMIXING FLUIDS IN PREDETERMINED PROPORTIONS

Charles H. Lindsay, Elmira, N.Y., assignor to Fire Control Engineering Company, Fort Worth, Tex.

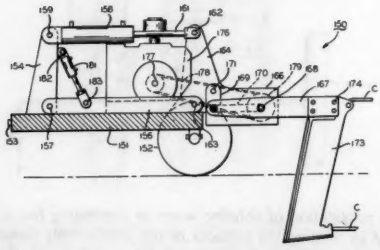
Filed May 11, 1970, Ser. No. 36,343
Int. Cl. A62c 35/00
U.S. Cl. 169—16 16 Claims



Apparatus for admixing fluids in a predetermined proportion characterized by, inter alia, first and second valves, connected together and disposed in their respective tapered throats and sized to effect the correct proportion of fluid flow therepast; the first valve being biased towards its no flow position by suitable force sufficient to require at least 2.5, and preferably about 5 pounds per square inch (p.s.i.) pressure differential across the valve to open it for flow therepast.

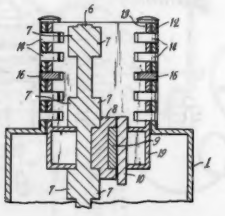
Delivery systems are provided for delivering the two fluids to be admixed at about the same inlet pressure. The second throat is movable with respect to the second valve to allow some flexibility in adjusting the proportion of the fluids, although for large variations in proportion, or concentration, of the second fluid, the second throat may be changed out entirely to give a larger or smaller range of areas of flow past the second valve.

3,647,003
SLIT TRENCHING MACHINE AND CABLE LAYER
Archie R. Gagne, R.R. #1, Box 146A, St. Charles, Ill.
Filed Mar. 6, 1970, Ser. No. 17,261
Int. Cl. A01b *63/32*; E02f *5/02*
U.S. Cl. 172—40 3 Claims



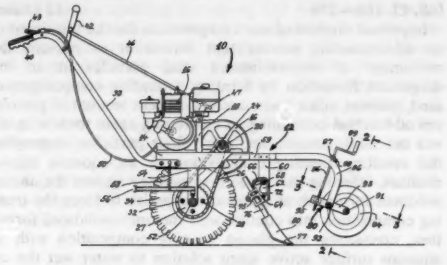
A cable plow including a ground-engaging vehicle having a plow member extending into the ground where it is driven orbitally to form a slit trench. Cable-laying means feed a flexible cable or the like into the slit trench as it is formed by movement of the vehicle over the ground surface.

3,647,004
VERTICALLY AND LATERALLY ADJUSTABLE PLOW STANDARD
Robert Leslie Edward Farmer, Yorkshire, England, assignor to R. L. Farmer Limited, Yorkshire, England
Filed June 12, 1969, Ser. No. 832,594
Claims priority, application Great Britain, June 18, 1968, 28,849/68
Int. Cl. A01b *49/02*, *15/12*, *65/02*, *65/06*
U.S. Cl. 172—152 8 Claims



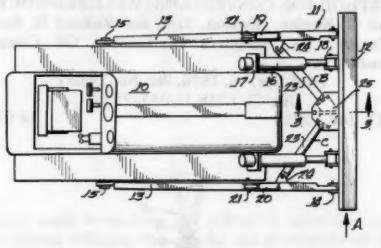
A plough for use on weed-infested land comprising a semimounted frame, at least one "full-digger" share and at least one "semidigger" share located at different vertical levels in positions that are spaced apart lengthwise of the frame. Means are provided for both coarse and fine vertical adjustments of the shares.

3,647,005
MOTOR POWERED PLOW
Woodrow Boyd, Route One, Lapine, Ala.
Filed Jan. 26, 1970, Ser. No. 5,633
Int. Cl. A01b *69/00*, *3/02*
U.S. Cl. 172—259 3 Claims



A hand guided, motor driven plow has a main driving wheel located under a platform directly beneath a massive driving engine which drives the wheel. Frame members extending forwardly of the platform carry an adjustable mounting for a plow blade which is disposed immediately forward of the main wheel. The cutting angle and elevation of the plow blade can be adjusted. Another adjustable mounting forward of the plow blade carries an auxiliary wheel which is adjustable in elevation. The main wheel, auxiliary wheel and plow blade are all vertically aligned in the central vertical plane of the plow.

3,647,006
BULLDOZER BLADE LOAD EQUALIZER
Ralph M. Kallenbach, 915 Carol, Elgin, Ill.
Filed May 15, 1969, Ser. No. 824,829
Int. Cl. E02f *3/76*
U.S. Cl. 172—803 1 Claim

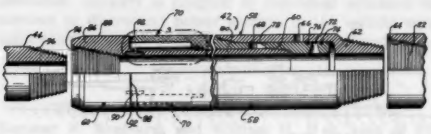


An apparatus for relieving and equalizing the stresses generated in the bracing and push arms of a bulldozer when the blade is adjusted to its tilt position and subjected to side load forces during operation, the described embodiment including diagonal braces mounted in a unitary fixture which is slidably associated with a fixed housing on said blade and limited to movement in directions normal to said blade.

3,647,007
STEERING SUB FOR UNDERWATER DRILLING APPARATUS
Thomas R. Norton, Placentia, Calif., assignor to Global Marine Inc., Los Angeles, Calif.
Filed Jan. 9, 1970, Ser. No. 1,736
Int. Cl. E21b *7/12*; E21c *19/00*
U.S. Cl. 175—5 16 Claims

A tubular steering sub, connected adjacent a drill bit at the bottom of a drill string, steers the bit into alignment with an

underwater well. The steering sub comprises an inner barrel splined to an outer barrel to permit axial relative movement between the barrels so that laterally disposed jet ports of the inner barrel and the outer barrel move in and out of align-



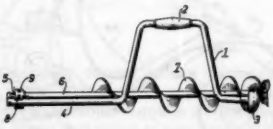
ment. When the jet ports are aligned, a lateral steering force on the bottom of the drill string is generated by pumping fluid down the drill string and out the jet ports. A releasable spring latch closes the steering sub by securing the barrels in fixed relation with their jet ports out of alignment.

3,647,008

COLLAPSIBLE DRILLING TOOLS AND THE LIKE

Karl G. Isaksson, Blyberg 2638, Alvdalen, Sweden

Filed July 31, 1970, Ser. No. 59,952
Claims priority, application Sweden, Aug. 26, 1969, 11810/69
Int. Cl. F25c *5/04*
U.S. Cl. 175—18 **4 Claims**



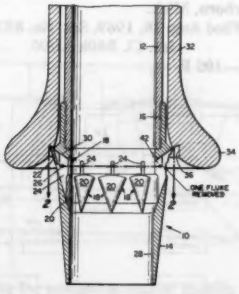
An arrangement for a collapsible drilling tool or the like, comprising a brace portion having a handle portion and a drill shaft which, through a link or the like, is connected with a drill holder shaft carrying a drill means or tool. When the arrangement is collapsed, distribution of the weight thereof is such that, when suspending the arrangement by the handle portion, the drill holder shaft lies to one side of a vertical line extending through the handle portion, and the angle between the pivoting plane of the drill holder shaft through the link in relation to the drill shaft and the vertical line is less than 90°.

3,647,009

FLUKED CORE RETAINER

Joseph A. Drelicharz, 2317 Chico Court, Oxnard, Calif.

Filed Sept. 17, 1970, Ser. No. 72,907
Int. Cl. E21b *25/00*
U.S. Cl. 175—242 **5 Claims**



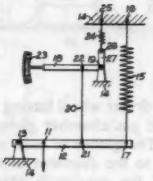
An arrangement for retaining a soil sample in a sampling tube, especially but not exclusively from remote locations such as the floor of the ocean or other body of water. A series of pivoted fingers are circumferentially spaced about the end of the tube, each finger having a sharp leading edge and a fluked rear edge which catches in the soil surrounding the tube when the latter is withdrawn. This pivots the leading edge inwardly to close the lower end of the tube and supports the enclosed soil sample during tube withdrawal.

3,647,010

MECHANICAL LOAD MEASURING SYSTEMS

Alfred Cyril Beardmore, Wednesbury; Geoffrey Cyril Cooke, Pedmore, and Donald Charles Stringer, Walsall, all of England, assignors to W. & T. Avery Limited, Birmingham, England

Filed June 30, 1969, Ser. No. 837,644
Int. Cl. G01g *23/26*
U.S. Cl. 177—230 **15 Claims**



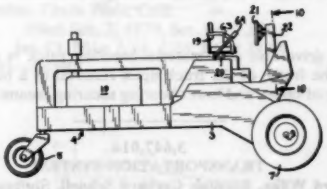
In a load measuring system such as self-indicating weighing machine a compensating spring is applied between a fixed point and a part of a lever of the system which is deflected when a load to be measured is applied thereto. The magnitude of the deflection provides the measure of the load and the spring serves to apply a compensating moment to the lever which varies with the amount of angular displacement thereof to oppose a nonlinear error otherwise inherent in the system as between the load actually applied and the quantity indicated by the magnitude of the deflection.

3,647,011

SPEED AND STEERING CONTROL FOR VEHICLES

Darrell E. Baumgartner, Owatonna, Minn., assignor to Owatonna Manufacturing Company, Inc., Owatonna, Minn.

Filed Apr. 13, 1970, Ser. No. 27,848
Int. Cl. B62d *11/04*
U.S. Cl. 180—6.48 **7 Claims**



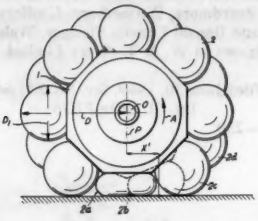
Apparatus for controlling the speed and direction of movement of a vehicle using a pair of hydraulic drive units, each unit including an engine driven fluid pump and a cooperating fluid operated motor. Each motor is drivingly connected to one of a pair of laterally spaced drive wheels, steering of the vehicle being effected by a differential in speed between the drive wheels. A pivotal control lever is connected by linkage to speed and direction control arms on the drive units and pivotal and bodily movements are imparted to the lever, to control speed and direction of vehicle movement, by a speed control element and a steering wheel.

3,647,012

SELF-PROPELLED DRIVE WHEELS

Julius Mackerle, Praque, Czechoslovakia, assignor to Ustav pro vyzkum motorovych vozidel, Praque, Czechoslovakia

Filed Feb. 18, 1970, Ser. No. 12,247
Claims priority, application Czechoslovakia, Feb. 21, 1969, 1251-69
Int. Cl. B62d 57/02
U.S. Cl. 180—8 F 7 Claims



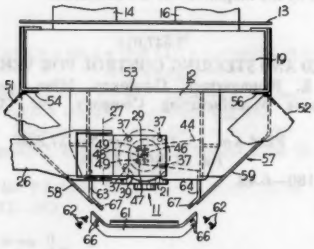
A self-propelled driver wheel having two series of circumferentially arranged gas chamber globes adapted to be successively inflated. The globes of each series having a diameter at right angles to the diameter of the wheel of between 25–35 percent of the maximum external noncompressed diameter of the driver.

3,647,013

REMOVABLE DRIVE UNIT FOR LIFT TRUCK

William J. Harrison, Guelph, Ontario, Canada, assignor to Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

Filed June 10, 1970, Ser. No. 44,945
Int. Cl. B62d 51/04
U.S. Cl. 180—13 13 Claims



The drive unit of a material-handling truck is removable from the frame of the truck upon removal of a bumper and release of upper and lower bearing securing means.

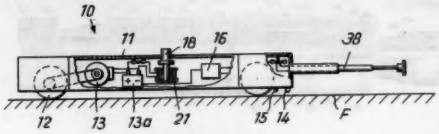
3,647,014

TRANSPORTATION SYSTEM

Gerhard Wilke, Korntal; Gerhard Schnell, Stuttgart N., and Karl Hoyer, Leinfelden, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Oct. 22, 1969, Ser. No. 868,295
Claims priority, application Germany, Oct. 24, 1968, P 18 04 791.1
Int. Cl. B60d 1/04
U.S. Cl. 180—14 11 Claims

A transportation system includes at least one transportable element, such as a pallet, platform or the like, on which loads may be supported and which has a lower face directed towards but upwardly spaced from any floor surface on which the transportable element rests. At least one self-propelled transporter element is provided and is so configurated as to be accommodatable beneath the lower face of the transportable element intermediate the lower face of the latter and a floor surface on which the transportable element rests. Releasable coupling means are provided for releasably



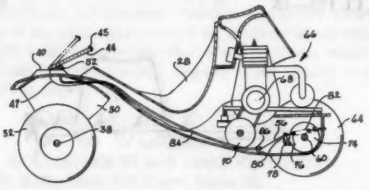
coupling the elements to one another when the transporter element is accommodated beneath the lower face of the transportable element so that the the latter may be transported by the transporter element while being connected thereto.

3,647,015

STEERING BAR BRAKE-ACTUATING DEVICE

John A. Plessinger, 1725 Wesleyan Road, Dayton, Ohio

Filed Apr. 6, 1970, Ser. No. 25,711
Int. Cl. B60t 7/08
U.S. Cl. 180—27 3 Claims



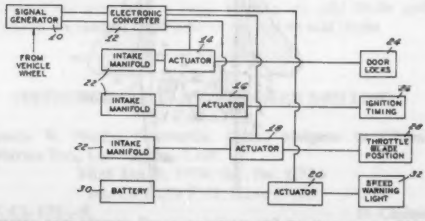
A brake for a vehicle having a steerable single front wheel rotatively disposed beneath the front portions and a live axle transversely disposed about the rear portions with wheels mounted thereon. A disc brake is attached about the rear axle for braking the rotation thereof and is linked by a brake cable to a steering bar that is rotatively disposed about the front portions of the vehicle for steering the single front wheel. Furthermore the steering bar is pivotable about a horizontal axis such that the upward forward movement of the steering bar about the horizontal axis p. . the brake cable forward, thereby actuating the disc brake and braking the rotation of the live axle.

3,647,016

VEHICLE SPEED RESPONSIVE SYSTEM

William D. Fitzsimons, Garden City, and Bernard G. Radin, Oak Park, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Aug. 28, 1969, Ser. No. 853,904
Int. Cl. B60k 13/00
U.S. Cl. 180—105 R 4 Claims



A signal generator connected mechanically to a vehicle wheel is coupled to electronic circuitry that actuates an item

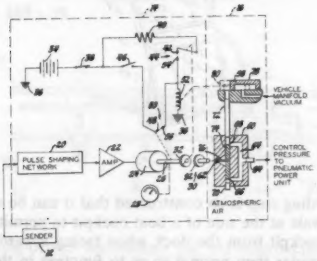
of vehicle equipment when a predetermined vehicle speed is attained. The system can be used to control ignition-timing, throttle-blade-positioning, exhaust-gas-recirculating, door-locking, speed-warning or speed-limiting equipment. The electronic circuitry is coupled to individual actuators that connect or disconnect power sources to the vehicle equipment when vehicle speed has attained predetermined values.

3,647,017

ELECTRONIC CRUISE CONTROL SYSTEM

Norman R. Brainard, and William H. Holl, both of Flint, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Sept. 11, 1969, Ser. No. 857,133
Int. Cl. B60k *31/00*
U.S. Cl. 180—105 5 Claims



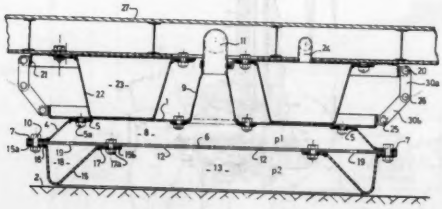
An electronic cruise control system having an electric torque motor whose output shaft tracks vehicle speed. A pneumatic pressure controller supplies a controlled pressure to a pneumatic power unit which in turn controls the position of a vehicle throttle. A clutch has one member attached for rotation with the torque motor output shaft and another member attached to a pneumatic valve. The clutch members are coupled together by a solenoid energized through a momentary switch such that any deviations of the torque motor output shaft position will control the pneumatic valve which in turn controls the pressure input to the power unit so as to position the vehicle throttle to provide for vehicle cruise control.

3,647,018

CONFINING SYSTEM FOR GROUND-EFFECT MACHINE

Francis Marie Jean Croix-Marie, Viry-Chatillon, and Robert Georges Grignon, Verriere le Buisson, both of France, assignors to Bertin & Cie, Plaisir, France

Filed Dec. 29, 1969, Ser. No. 888,516
Claims priority, application France, Dec. 26, 1968, 180809
Int. Cl. B60v *1/06, 1/16*
U.S. Cl. 180—124 4 Claims



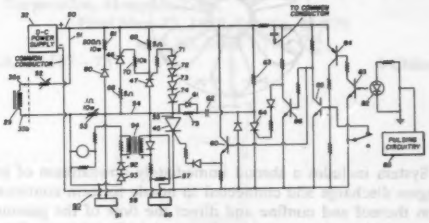
An arrangement for sustaining and/or guiding a load such as a machine or vehicle over a bearing surface by means of air cushions confined in a chamber formed inside an annular trough-shaped inflatable wall between said bearing surface and a movable partition forming with the load and an annular deformable wall a chamber of a variable volume. The input of a compressed fluid into the latter feeds through ports in the partition the cushion-confining chamber so that the latter is sustained at a small self-adjusting distance over the bearing surface.

3,647,019

TRANSIENT DAMPER FOR PNEUMATIC SOUND SOURCE EMPLOYING AN ELECTROMAGNET FOR CONTROLLING ITS RELEASE VALVE

Silvan E. McAlpin, Dallas, Tex., assignor to Mobil Oil Corporation

Filed Feb. 27, 1970, Ser. No. 15,110
Int. Cl. G01v *1/02*
U.S. Cl. 181—.5 5 Claims



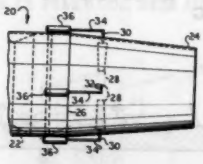
The specification discloses a pneumatic sound source comprising a pressure chamber for receiving gas and having a controllable valve for opening and closing an outlet port. An electromagnet including an electrical coil is energized to hold the valve in its closed position and is deenergized for releasing the valve for the generation of an acoustic pulse. Current is applied to the coil by way of a normally closed switch which is opened to deenergize the coil. Circuitry is coupled across the coil and is actuated, when the valve begins to move following deenergization of the coil, to allow current to flow through the circuitry to shunt the coil, thereby dampening the magnitude of a transient voltage generated by movement of the valve through the path of the decaying magnetic flux.

3,647,020

JET PROPULSION APPARATUS AND OPERATING METHOD

Howard R. MacDonald, San Diego, Calif., assignor to Rohr Corporation, Chula Vista, Calif.

Filed Feb. 2, 1970, Ser. No. 7,520
Int. Cl. F01n *1/14, 1/18;* B64d *33/06*
U.S. Cl. 181—33 HC 3 Claims



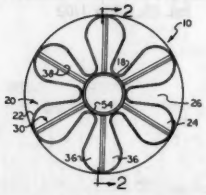
Vanes are mounted on jet engine nozzle or a plug associated therewith for movement between a position wherein they permit normal flow of the exhaust gas of the engine in a direction parallel with the longitudinal axis of the nozzle, and a position wherein they cause the exhaust gas to whirl about said nozzle axis as it travels longitudinally thereof. When the

vanes whirl the exhaust gas its rate of mixing with atmospheric air is increased, thus suppressing jet noise.

3,647,021
SOUND SUPPRESSION SYSTEM

Victor Millman, San Diego, and Wallie P. Gray, Chula Vista, both of Calif., assignors to Rohr Corporation, Chula Vista, Calif.

Filed June 22, 1970, Ser. No. 47,955
Int. Cl. B64d *33/06*; F02k *1/26*
U.S. Cl. 181—33 HC **11 Claims**

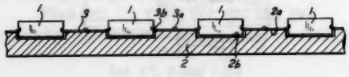


System includes a shroud immediately downstream of jet engine discharge and connected to nozzle to form continuation thereof and confine and direct the flow of the gaseous stream. Shroud is corrugated in axial direction to form peripherally spaced, radially extending lobes to serve as discrete discharge passages for gaseous stream. Valleys between lobes define flow paths for free stream air to flow between lobes and mix with gaseous stream at fluted margin to attenuate noise. Sound absorbing panels are inserted in some or all of the lobes to further attenuate noise. The panels are preferably planar and extend radially and axially in the lobes to divide them into additional discharge passages. Each panel comprises planar solid septum, honeycomb core in each face, and a face sheet on each honeycomb core, all secured together to form rigid panel, preferably of metal to further serve as reinforcement for lobe. Multiplicity of apertures in face sheets communicate with core cavities to form multiplicity of sound traps so that each face has sound absorbing characteristics. System may be used with fan jet engine if fan air exhausts into same discharge zone with turbine gas.

3,647,022
SOUND ABSORBER CONSTRUCTION

Erwin Meyer; Klaus-Dieter Brendel, both of, Goettingen; Hans Blau, Baden-Baden, and Gerhard Stoof, Hilden, all of Germany, assignors to Grunzweig & Hartmann AG, Ludwigshafen am Rhine, Germany

Filed Nov. 28, 1969, Ser. No. 880,550
Claims priority, application Germany, Nov. 30, 1968, P 18 11 998.7
Int. Cl. E04b *1/86*
U.S. Cl. 181—33 G **16 Claims**

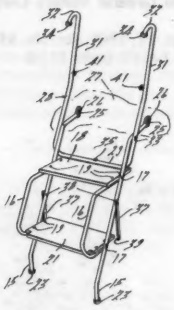


A sound absorber construction for absorbing sound waves transmitted through a liquid medium. A support having an exposed surface area is provided with a plurality of discrete sound absorbing units distributed over the surface area with spacing from one another. Mounting means connects the sound-absorbing units to one another and also mounts them on the exposed surface area of the support.

3,647,023
BOAT BOARDING STEP AND SEAT

William A. Bedford, Jr., 633 South Palm Avenue, Sarasota, Fla.

Filed Aug. 3, 1970, Ser. No. 60,661
Int. Cl. E06c *5/24*
U.S. Cl. 182—23 **11 Claims**

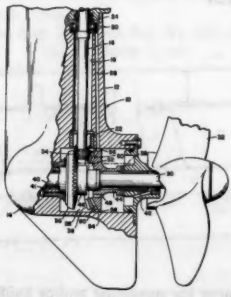


The boarding step is so constructed that it can be secured to the gunwale at the side of a boat cockpit to permit one to enter the cockpit from the dock when facing inwardly. The treads are wider than normal so as to function in the same manner as a plurality of steps. A pivoted U-shape frame on the step may be swung rearwardly to form the rear legs and back of a chair or which can be swung upwardly to a substantially vertical position to form handholds on both sides of the step to provide stability for one entering the cockpit. When the legs are moved to a position in alignment with the center of the treads, the boarding step forms a compact unit for storage. The hangers to which the spaced heads on the end of the boarding step are secured are unique in being of the locking-type to prevent the accidental separation after installation.

3,647,024
UPPER DRIVESHAFT BEARING LUBRICATION FOR MARINE PROPULSION UNIT

Gerald H. Wick, Menomonee Falls, and Theodore J. Holtermann, Milwaukee, both of Wis., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed Apr. 30, 1970, Ser. No. 33,832
Int. Cl. F16n *7/16*
U.S. Cl. 184—6.18 **6 Claims**



An arrangement for lubricating the upper bearing for a drive shaft in a marine propulsion unit. A disc-shaped

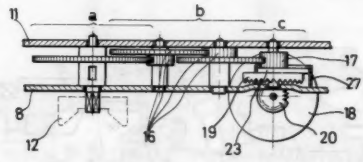
member, which may be a gear used to drive a propeller, is situated below the upper bearing in the bore of a gearcase. Lubrication oil is supplied to the gearcase. There is a small clearance between the bore of the gearcase and the outside diameter of the disc-shaped member to prevent rapid leakage of oil from around the periphery of the disc-shaped member. The disc-shaped member when rotating acts as a centrifugal impeller throwing oil out from its center and up a passageway to the upper bearing. The lubricating oil spills over the upper bearing and returns to the gearcase by way of a drive shaft passage to provide a continuous lubricating means.

3,647,025

SPRING-OPERATED DRIVING MECHANISM FOR TOY MICROVEHICLES

Raimundo Paya Rico, Santa Rita 33, Ibi, Spain

Filed May 14, 1970, Ser. No. 37,166
Claims priority, application Spain, July 7, 1969, 150,140; Mar. 5, 1970, 156,537
Int. Cl. F03g *1/00*
U.S. Cl. 185—39 **7 Claims**



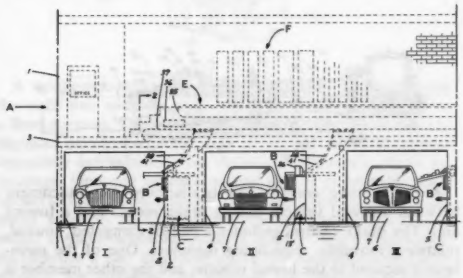
A spring-driven mechanism for toy microvehicles has a braking device for obtaining a slow unwinding of the spring. This has a rotary wheel where a movable mass is radially guided, and the mass under the effect of centrifugal force has a tendency to enter into contact with a fixed surrounding cover according to a pressure depending on the force. A faceted shaft is provided for winding up the spring and is operated by means of a specially designed wrench which on account of a large flat base rests during operation on the external face of the toy, thus avoiding a pendular movement taking place and causing the uncoupling of the wrench during winding.

3,647,026

AUTOMATIC DRIVE-IN STORE

Gilbert L. Alexander, Bloomington, Ill.; Arthur W. Neaville; William A. Mayfield, both of Webster Groves, Mo.; Gilbert L. Alexander, 1114 E. Taylor Street, Bloomington, Ill.; Arthur W. Neaville, 912 S. Rock Hill Road, and William A. Mayfield, 813 N. Forest, both of Webster Groves, Mo.

Filed Dec. 31, 1969, Ser. No. 889,502
Int. Cl. E04h *3/04*
U.S. Cl. 186—1 C **16 Claims**



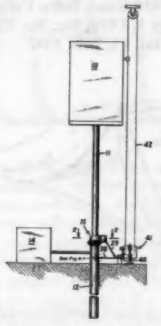
An automatic drive-in store structure having in its upper portion a warehouse for storing a multiplicity of diverse retail items within individual dispenser units, and in its lower portion a plurality of parking stalls for vehicles, each stall being provided with a console control apparatus which is equipped with a plurality of item selector panels for use by a motorist whereby a selective list of retail items may be ordered and thence dispensed from the respective dispenser unit responsive to electronic control means and delivered through a system of conveyors to the automobile; said console control apparatus also being supplied with a closed circuit television which is in circuit with a video camera for transmitting a picture of a selected item onto a television screen, and a moneychanger unit which returns the correct change after registering the amount submitted and subtracting the total price of the items selected.

3,647,027

SAFETY SYSTEM FOR HYDRAULIC ELEVATORS

Lawrence Flower Jaseph, Memphis, Tenn., assignor to Dover Corporation, Memphis, Tenn.

Filed Mar. 23, 1970, Ser. No. 21,779
Int. Cl. B66b *5/16*
U.S. Cl. 187—73 **6 Claims**



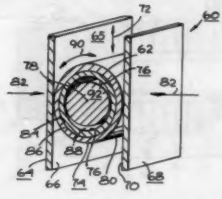
Emergency braking system for hydraulic elevators responsive to abnormal operating conditions including loss of pressure in the jack cylinder through rupture of the cylinder or of fluid conduit means and overspeed of the elevator cab in the downward direction. The system includes selectively operable braking means controlled by a pressure responsive actuating means, normally exposed to the fluid pressure in the cylinder with a pilot valve operated by speed responsive means when downward movement exceeds a predetermined value.

3,647,028

ENERGY ABSORBING ARRANGEMENT

David L. Platus, 2001 Holmby Avenue, Los Angeles, Calif.

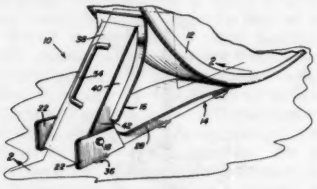
Filed Aug. 9, 1968, Ser. No. 751,606
Int. Cl. F16d *63/00*; B62d *1/16*
U.S. Cl. 188—1 **23 Claims**



There is disclosed herein an energy-absorbing arrangement in which a plurality of outer thin-walled, cylindrical, tubelike,

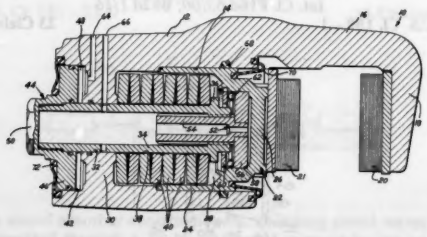
annular, ductile metal members are confined in a space between two body members. Each of the plurality of outer thin-walled energy-absorbing members has at least one additional, similar, inner thin-walled energy-absorbing member concentrically mounted within it in a nested relationship. The body members are adapted to have relative motion therebetween in a preselected direction. The spacing between the two body members is less than the unstressed diametral dimension of the outermost of the energy absorbing members, and therefore all of the energy-absorbing members are diametrally deformed under force by the two body members and relative motion of one body member with respect to the other in a preselected direction rolls the energy-absorbing members and thereby absorbs energy due to the cyclical plastic deformation or hysteretic deformation thereof. A nondeformable rigid retainer means may be positioned within the innermost of the energy-absorbing members to limit the diametral deformation thereof to prevent stress relieving plastic flow or creep of the energy-absorbing members.

3,647,029
WHEEL CHOCK
John J. Hanley, 605-1650 Road, Delta, Colo.
Filed May 1, 1970, Ser. No. 33,587
Int. Cl. B60t *3/00*
U.S. Cl. 188—32 **6 Claims**



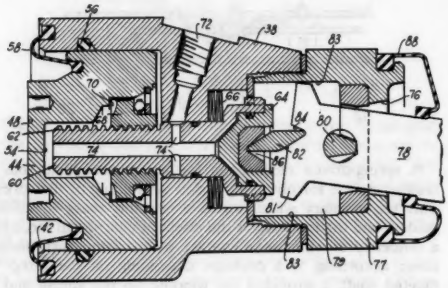
A base member has a downwardly curved forward end portion which clamps the chock to a ground surface as soon as contact is made with a vehicle tire. The rear end of the base member pivotally mounts a movable member that has an outwardly and upwardly curved bottom edge for engaging the periphery of the tire as it moves into engagement with the chock. The curved nature of the movable member ensures continued intimate engagement with the tire. Abutments are attached to the base and movable members to function as mechanical stops after the tire has moved sufficiently onto the base.

3,647,030
SPRING-APPLIED DISC BRAKE
Richard T. Burnett, South Bend, Ind., assignor to The Bendix Corporation
Filed May 18, 1970, Ser. No. 38,088
Int. Cl. F16d *55/14, 65/24*
U.S. Cl. 188—72.3 **7 Claims**



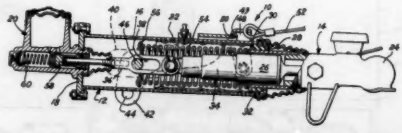
A disc brake is disclosed which has a spring actuator in addition to the usual hydraulic actuation. When the brake is functioning normally, fluid pressure opposes the spring actuator to permit normal hydraulic operation of the brake. However, when fluid pressure is not available to the brake, because of a malfunction or because the vehicle operator has closed a valve to isolate the brakes from the vehicle's hydraulic system, the spring actuator maintains the frictional elements engaged with the rotor. The spring actuator, therefore, functions as both a parking brake and a fail-safe brake that immobilizes the vehicle when a malfunction in the vehicle's hydraulic system occurs. Mechanical release means are provided to release the spring actuator to permit the vehicle to be moved if the spring actuator has applied the brake while the vehicle is standing in an inconvenient location.

3,647,031
PARKING BRAKE ACTUATOR FOR DISC BRAKES
Richard T. Burnett, South Bend, Ind., assignor to The Bendix Corporation
Filed Oct. 3, 1969, Ser. No. 863,482
Int. Cl. F16d *55/26*
U.S. Cl. 188—72.6 **4 Claims**



A parking brake actuator for a caliper disc brake includes an elongated member shiftable in the caliper housing for actuating the brake shoes. The member is shifted by a lever mounted on the housing that is swingable about a point substantially coaxial with the member. A toggle link interconnects the lever and the member for shifting the latter in response to movement of the lever.

3,647,032
SURGE BRAKE CONTROL
Edward K. Dombeck, South Bend, Ind., assignor to The Bendix Corporation
Filed June 17, 1970, Ser. No. 47,069
Int. Cl. B60t *7/20*
U.S. Cl. 188—112 **6 Claims**



A surge brake control unit is disclosed for attachment between a towed vehicle having brake means and a towing unit. The brake control includes a pair of elongated, coaxial, relatively movable, telescoping members. One of the members is secured to the towed vehicle, and the other member is adapted to be secured to the towing unit. Cooperative abutment means are provided on each of the members, and a spring yieldably urges the abutment means on the one

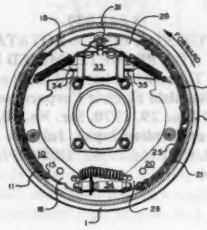
member into engagement with the abutment means on the other member. A brake-applying device is carried at one end of the one member, and is engaged with the end of the other member. Upon relative movement between the members, the brake applying device applies the towed vehicle's brakes.

3,647,033

SECONDARY SHOE BRAKE LINING

Bruce W. Klein, South Bend, Ind., assignor to The Bendix Corporation

Filed May 21, 1970, Ser. No. 39,411
Int. Cl. F16d 51/24
U.S. Cl. 188—251 R 3 Claims



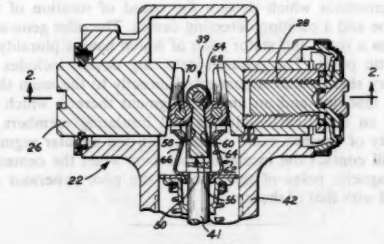
In a vehicle servo brake of the type having a rotatable brake drum and a primary and a secondary shoe operable to stop rotation of the drum the improvement wherein the secondary shoe has a lining wherein at least 50 percent of the total surface area of the lining is a semimetallic material and at least 15 percent is organic material.

3,647,034

FLOATING OUTPUT WEDGE WITH ARTICULATED PULL ROD

George F. Wieger, South Bend, Ind., assignor to The Bendix Corporation

Filed Aug. 20, 1970, Ser. No. 65,553
Int. Cl. F16d 51/22
U.S. Cl. 188—343 7 Claims



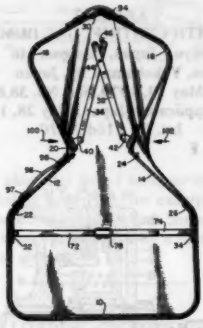
A wedge-actuated drum brake is disclosed which includes the usual pair of brake shoes which are slidably mounted on a fixed support. The customary pair of actuator housings are disposed between adjacent ends of the two shoes. A pair of oppositely acting pistons are slidably disposed in each of the housings. One end of each of the pistons is operably connected to the corresponding ends of the brake shoes. The opposite adjacent ends of the pistons are spread apart by a wedge actuator when the brake is applied. The wedge actuator includes a pair of rollers which are mounted on a guide member for engaging the ends of the piston. The guide member is forced between the pistons by an actuating rod which also carries a wedge-shaped member that is adapted to force the rollers apart. The wedge is pivotally mounted on the actuating rod to permit the wedge to articulate as it is forced between the rollers, thus preventing damage to the wedge, the actuating rod, the rollers, or the guide member.

3,647,035

COLLAPSIBLE LUGGAGE BAG

William Honig, 520 East 77th Street, New York, N.Y.

Filed Feb. 2, 1970, Ser. No. 7,743
Int. Cl. A45c 7/00
U.S. Cl. 190—45 7 Claims



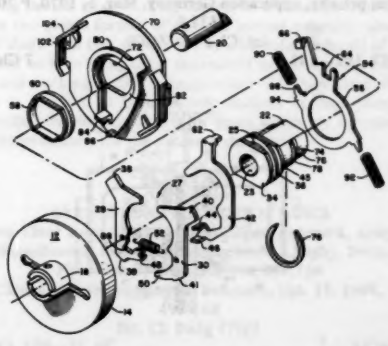
A collapsible luggage bag which can be reduced in size to approximately one-third its original volume comprises a plurality of hinged panels covered by a soft foldable outer cover. An adjustable bracing means retains the panels in a fully open position but, when released, permits the panels to collapse by means of their hinged connections to a bag approximately one-third its original size. The outer material includes a slide fastener and two pulls adapted to confront each other at a point along the slide fastener. When the bag is collapsed, the two pulls may be moved to a position at which they are adjacent each other to effectively close the collapsed bag without requiring closure of the entire slide fastener.

3,647,036

FRICTION CLUTCH

Gerhard Cless, Skokie, Ill., assignor to Teletype Corporation, Skokie, Ill.

Filed July 6, 1970, Ser. No. 52,315
Int. Cl. F16d 11/06
U.S. Cl. 192—26 4 Claims



A pair of coiled compression springs expand to urge a clutch actuator from an uncoupled to a coupled position in

which shoes carried from a driven member couple it to a driving member. In the uncoupled position, the shoes are released from the driving member and the springs are compressed with their axes parallel.

The springs engage the actuator tangentially from opposite sides for urging it angularly and are proportioned such that as the springs expand the distance through which they work increases, and the torque applied to the actuator increases because the increase of torque due to the increase in distance is greater than the loss of torque due to spring relaxation. Accordingly, as the clutch wears torque applied to couple the driving and driven members increases.

3,647,037

CLUTCH WITH CENTRIFUGAL DUMP VALVE

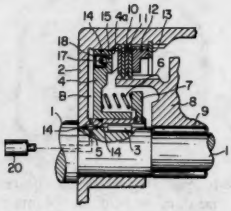
Setsuo Toma, Tokyo, Japan, assignor to Nissan Jidosha Kabushiki Kaisha, Yokohama City, Japan

Filed May 19, 1970, Ser. No. 38,824

Claims priority, application Japan, May 28, 1969, 44/40884

Int. Cl. F16d *23/10*

U.S. Cl. 192—106 F **5 Claims**



A hydraulic clutch having a piston controlling the engagement of a frictional multiple disk clutch and a drift-check valve for selectively exhausting the liquid under pressure from an operating chamber behind the piston. The drift-check valve comprises a relief passage and a truncated-conical valve element, which valve element blocks the relief passage with the flat base or end surface thereof upon an increase in the fluid apply pressure, and opens the relief passage by tumbling of the valve element upon a decrease in the fluid pressure.

3,647,038

POWER DRIVEN POSITIONING SYSTEM WITH INTERRUPT MEANS UPON APPLICATION OF A POSITIONING FORCE AT END POINTS OF TRAVEL

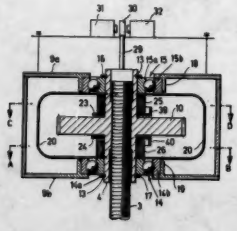
Jurgen Balz, Heilbronn/Neckar, Germany, assignor to Firma Helmut Balz GmbH, Heilbronn/Neckar, Germany

Filed July 20, 1970, Ser. No. 56,608

Claims priority, application Germany, Mar. 5, 1970, P 20 10 431.8

Int. Cl. F16d *71/00*

U.S. Cl. 192—141 **7 Claims**



A rotatable positioning member driven, for example by a gear over a motor moves a threaded spindle in an axial direction to position the spindle, for example for placement of a valve. When the threaded spindle, for example with a valve element at the end, reaches a terminal position, the positioning member will travel axially on the threaded spindle. The positioning member is located in a housing and is held in rotatable position by the inner races of an axially movable ball bearing, the outer races of which are held separated and apart by a pair of U-shaped leaf springs. Upon axial excursion of the positioning member, the bearings will be moved axially against the force of the spring, and axial movement transmitted to frictionally engage a camming disk with the rotatable positioning member which, upon rotation, operates an electrical switch to interrupt the power when the force of application of the spindle to the terminal position is matched to the compression force of the U-shaped spring.

3,647,039

APPARATUS FOR STOPPING A ROTATABLY DRIVEN MACHINE AT A PREDETERMINED POSITION

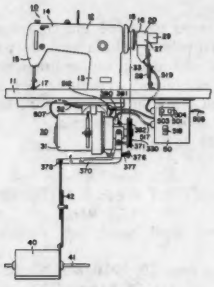
Syoichi Oke, and Takanori Kobayashi, both of Nagoya, Japan, assignors to Mitsubishi Electric Corporation, Tokyo, Japan

Filed June 29, 1970, Ser. No. 50,820

Claims priority, application Japan, July 10, 1969, 44/54758

Int. Cl. F16d *71/02;* **D05b** *69/26*

U.S. Cl. 192—146 **5 Claims**



A rotatably driven sewing machine is enabled to be stopped at a predetermined position through the use of a pilot generator which detects the speed of rotation of the machine and a position detecting device. The pilot generator includes a rotor and stator each of which have a plurality of magnetic poles. The position detecting device includes an auxiliary shaft which is connected directly to the main shaft of the machine and an annular segment thereon which includes an electrical conductor and insulating members. A plurality of brushes make contact with the annular segment and will contact the insulating members when the center of the magnetic poles of the rotor of the pilot generator are aligned with that of the stator.

3,647,040

SINGLE PRINTING ELEMENT POSITIONING MECHANISM

Hermann Waldenburger, Wolkersdorf, and Herbert Decker, Lauf, both of Germany, assignors to Triumph Werke Nurnberg A.G., Nuernberg, Germany

Filed Sept. 17, 1969, Ser. No. 858,696

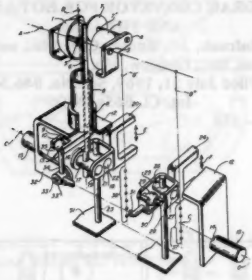
Claims priority, application Germany, Sept. 28, 1968, P 17 86 405.0

Int. Cl. B41j *23/00*

U.S. Cl. 197—16 **5 Claims**

A mechanism for high-speed printing characterized by a low mass type body positionable about first and second intersecting axes for type selection, and mounted on support structure swingable about a third axis parallel to the first to

effect printing of a selected type character. The mechanism is constructed so that the second axis intersects the first and third axes and so that points of connection with operating members to rotatably position said body variably about said



first and second axes are coincident or closely adjacent the third axis and are substantially aligned with said second axis when the type body is brought to printing position; the construction being such as to minimize to a negligible degree any deviation of the positioned type relative to a print point.

3,647,041

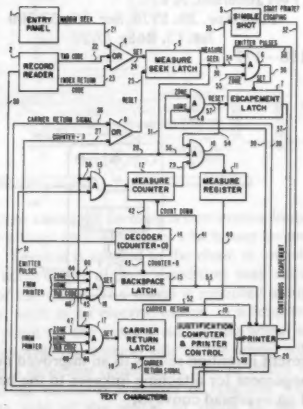
SYSTEM FOR DETERMINING LINE MEASURE

William H. Davis; Louis M. Hornung; Royce D. Lindsey, and Howard C. Tanner, all of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1970, Ser. No. 51,087

Int. Cl. B41j *5/30*

U.S. Cl. 197—19 **7 Claims**



A system for determining and entering line measure into a justification computer for controlling the format of output copy. During an output operation when there is a necessity for determining line measure, a measure seek code is detected, escapement of the carrier initiated, the escapement of the carrier sensed, and the units of escapement counted. Upon sensing the location of the right margin stop, escapement is terminated. Thereafter the carrier is returned to the position occupied prior to the measure seek code being read. The number of units counted is the line measure which is then used for control of output.

3,647,042

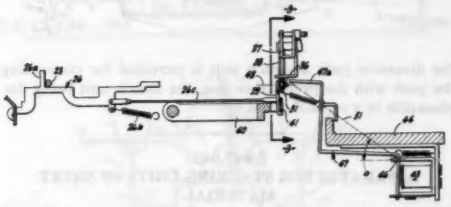
ELECTRICAL CHARACTER SELECT MECHANISM FOR TYPEWRITER

Roland T. Smith, San Francisco, Calif., assignor to Novar Corporation

Filed July 20, 1970, Ser. No. 56,541

Int. Cl. B41j *5/30*

U.S. Cl. 197—19 **3 Claims**



An electrical character select mechanism for a typewriter of the single printing head type, for example the IBM Selectric, where the selector latches which control tilt and rotation of the printing head are actuated by a number of relays specially located and shaped.

3,647,043

DEVICE FOR LOADING OBJECTS AND CONVEYING THEM FROM A LOADING STATION TO AT LEAST ONE WORKING STATION

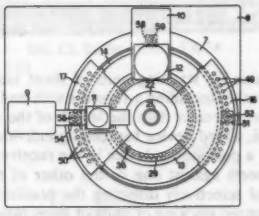
Bruno Garetto, Ivrea, Italy, assignor to Ing. C. Olivetti & C. S.p.A., Ivrea, Italy

Filed Apr. 23, 1970, Ser. No. 31,222

Claims priority, application Italy, Apr. 28, 1969, 51605 A/69

Int. Cl. B23q *1/04, 5/22*

U.S. Cl. 198—19 **5 Claims**



A device for loading objects and conveying them from a loading station to a working station of a machine tool comprises two plates formed of circular sectors rotatable about a fixed shaft. The two sectors are rotated independently of one another so as to bring them alternately to said loading station and said working station through a pair of friction rings. Each plate is retained at the different stations by stop plungers controlled by electromagnets for times which are determinable independently for the different stations.

3,647,044

BYPASS FOR PRODUCTION LINES

Preben Einer Roar Orstam, Copenhagen, Denmark, assignor to Skandinavisk Emballage Aktieselskab, Lyngby, Denmark

Filed Oct. 8, 1969, Ser. No. 864,736

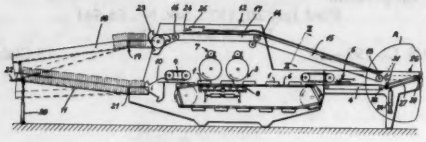
Claims priority, application Denmark, Oct. 15, 1968, 4959/68

Int. Cl. B65g *47/26*

U.S. Cl. 198—31 AC **3 Claims**

A bypass for production lines for diverting blanks advanced on the line, particularly polygonal blanks of fiber

material or a similar light material, past a working unit incorporated in the line. The bypass comprises a diversion path extending in a vertical plane, and at least at the beginning of

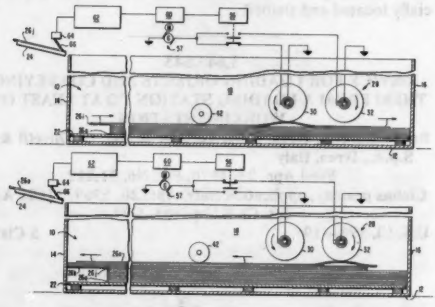


the diversion path a switch unit is provided for connecting the path with the production line, the switch unit being displaceable in a vertical plane.

3,647,045
APPARATUS FOR STACKING UNITS OF SHEET MATERIAL

Hans F. Wegener, Michigan City, Ind., assignor to National Steel Corporation

Filed Feb. 6, 1970, Ser. No. 9,184
Int. Cl. B31b *1/96, 1/98;* **B65b** *57/20*
U.S. Cl. 198—41 **13 Claims**

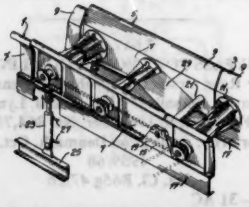


An apparatus for stacking units of sheet material in staggered relationship including a receiver with end plates spaced apart a distance greater than the length of the sheet material to be stacked, a feed device for feeding individual sheets into the receiver, a positioning device in the receiver for directing individual sheets against one or the other of the end plates and a control selectively directing the positioning device to achieve staggered stacking of units of sheet material.

3,647,046
CONVEYOR

Jean-Paul Tanguay, and Elie Dallaire, both of De Roberval, Quebec, Canada, assignors to Placements Jean Paul Tanguay Limitee, St. Prime, Quebec, Canada

Filed June 10, 1970, Ser. No. 44,995
Int. Cl. B65g *13/02*
U.S. Cl. 198—127 **5 Claims**

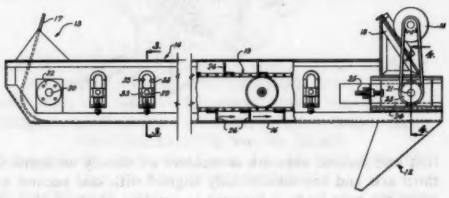


A conveyor, for tree stems, formed of a fixed section and of a section capable of pivoting upwardly about an axis transverse to the direction of travel of the tree stems. The fixed as well as the pivotable sections are provided with gripper rollers adapted to drive the tree stems in the conveyor.

3,647,047
INCLINED DRAG CONVEYOR FOR HOT ASPHALT MIX AND THE LIKE

Lamson Rheinfrank, Jr., Kansas City, Mo., assignor to Standard-Havens, Inc., Glasgow, Mo.

Filed July 31, 1969, Ser. No. 846,344
Int. Cl. B65g *19/06*
U.S. Cl. 198—174 **2 Claims**

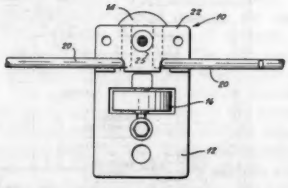


The lower flight of the slatted drag chain of the conveyor is yieldably biased toward the floor plate. The biasing force is obtained through the medium of idler wheels interposed between the flights and supported for floating movement between adjustable limit stops away from and back toward the floor plate.

3,647,048
OVERHEAD CONVEYOR TROLLEY PLATES

Robert Krammer, Farmington, Mich., assignor to John M. Leach, Port Jefferson, N.Y.

Filed Apr. 30, 1970, Ser. No. 33,300
Int. Cl. B65g *17/20*
U.S. Cl. 198—177 **2 Claims**



The present invention relates to an improved quick disconnect arrangement for attaching linkages to the baseplate of a trolley of an overhead conveyor.

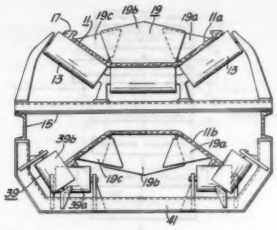
3,647,049
STEEP SLOPE BELT CONVEYOR

Harry F. Hartzell, Jr., Allison Park, Pa., assignor to Koppers Company, Inc.

Filed May 22, 1970, Ser. No. 39,640
Int. Cl. B65g *15/08, 15/42*
U.S. Cl. 198—192 **1 Claim**

A steep slope belt conveyor for moving and elevating bulk material comprises a flexible belt supported by trough-shaped carrying idler rollers. Overlapping baffles mounted transversely at spaced intervals along the length of the load-carrying belt surface holds the bulk material on the belt sur-

face and prevents such material from gravitating down the belt. The longitudinal edges of the belt are specially shaped

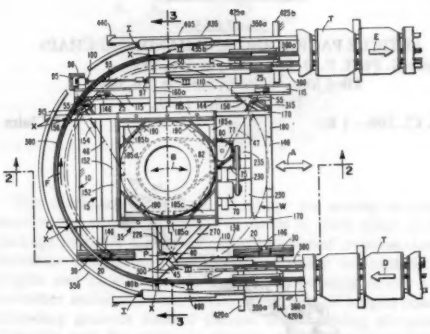


to engage return idler rollers so that the belt maintains its troughlike contour during the return run.

3,647,050
SPROCKET DRIVE TENSIONING MOUNT FOR CONVEYORS

Warren D. Neal, Walkersville, Md., assignor to Aerojet-General Corporation, El Monte, Calif.

Filed June 11, 1970, Ser. No. 45,403
Int. Cl. B65g *15/30*; B65b *23/02*
U.S. Cl. 198—203 **20 Claims**

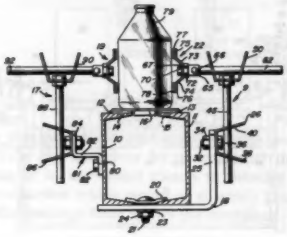


A chain-type conveyor forming a continuous loop of chain is driven by a large sprocket wheel which may be several feet in diameter. Tension is applied to the chain at one side of the wheel and accordingly a slack condition may occur at the other side of the wheel. The wheel is mounted along with its power drive, such as an electric motor, in a framework having a pivot point on the tension side of the wheel so that as the wheel revolves the tension side of the wheel will tend to be swung in a direction opposite to that in which tension is furnished to the chain, as a matter of reaction. This causes the opposite side of the wheel to swing in the opposite direction thereby taking up slack in the chain leaving the wheel at that side. The distance from the pivot point about which the mounting frame of the wheel can swing to the adjacent periphery is considerably shorter than the distance from the pivot point to the opposite side of the wheel so that only such torque as is necessary for taking up slack will be provided. Means are provided for telescopic movement of the conveyor guide and chain tracks to compensate for tensioning movement of the sprocket wheel mount. On carousel tray sorters where large sprockets are required to provide tray clearance, considerable space is saved and sorter length reduced by eliminating the need for a separate takeup loop. Additionally, the construction permits convenient initial tensioning of the chain by means of a weight bias acting on the mount.

3,647,051
FAST ADJUSTMENT DEVICE FOR CONVEYOR GUIDE RAILS

Ronald E. Didas, Dansville, N.Y., assignor to Stone Conveyor Co., Inc.

Filed May 26, 1970, Ser. No. 40,560
Int. Cl. B65g *15/60*
U.S. Cl. 198—204 **7 Claims**

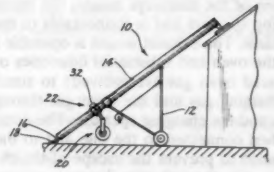


Side rails are mounted over a conveyor. Each rail is connected to perpendicularly oriented rods that are slidably disposed in spring-retainer clamps. By selectively releasing the clamps, the rods may be longitudinally adjusted to position an associated side rail into close proximity with the outward contour of a conveyed article.

3,647,052
TRANSPORT ATTACHMENT FOR GRAIN AUGERS

Calvin R. Edinger, Cathay, N. Dak.

Filed Nov. 6, 1969, Ser. No. 874,634
Int. Cl. B65g *41/00*, *33/14*
U.S. Cl. 198—233 **1 Claim**



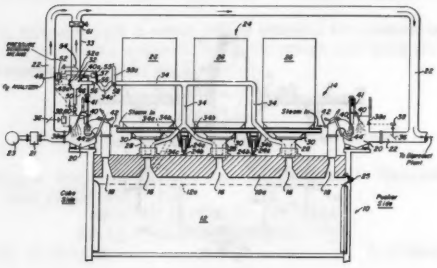
A transport attachment for grain augers to permit the auger to be manually moved, comprising a support means movably mounted on the grain auger and having a wheel means extending downwardly therefrom. The support means comprises a split tubular member which is selectively slidably mounted on the grain auger above the lower thereof which is selectively locked in first and second positions thereon. The wheel means engages the ground to support the lower end of the grain auger thereabove when the support means is in its first or transport position. The support means and wheel means are moved upwardly on the grain auger to the said second position to move the wheel means out of ground engagement thereby permitting the grain auger to be conventionally operated.

3,647,053

APPARATUS FOR AND METHOD OF COLLECTING SMOKE FROM COKE OVENS DURING CHARGING

Pete Palumbo, Bethel Park, Pa., assignor to United States Steel Corporation

Filed Nov. 20, 1969, Ser. No. 878,302
Int. Cl. C10b *31/04*
U.S. Cl. 202—263 34 Claims



An apparatus for and method of smokeless charging of a heated coke oven with coal at a lower temperature than the temperature of the oven is disclosed. The oven of the apparatus is provided with a charging aperture for receiving the coal and with an exhaust aperture for any gases evolved in the oven. The oven has a collector main connected to the exhaust aperture and an exhaust means connected to the collector main for removing gases from the oven. A Larry car is movable on the oven and has hopper means adapted to contain the coal. The hopper means has discharge means movable into registry with and into sealing engagement with the charging aperture. Gate means are on the hopper means for controlling the flow of the coal through the discharge means and through the charging aperture into the oven. A charging gas collecting main is on the oven in communication with the exhaust means. A conduit means on the Larry car communicates with one of the discharge means, the hopper means, and the charging aperture and is connectable to the charging gas collector main. The exhaust means is operable (when the coal engages the oven and substantial quantities of charging gas and displaced oven gas are evolved) to simultaneously exhaust the charging gas and the oven gas through the exhaust aperture and the charging aperture. The conduit means is operable when connected to the one and to the charging gas collector main to prevent the escape of the charging gas and the oven gas through the hopper means and the discharge means to the atmosphere.

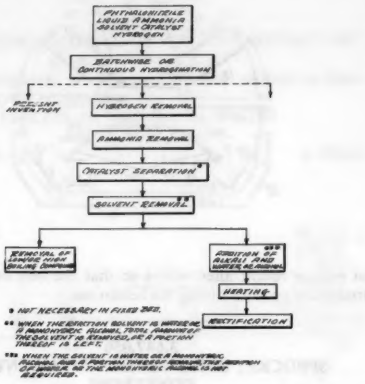
3,647,054

PROCESS FOR PURIFYING XYLYLENEDIAMINE BY ALKALINE AGENT ADDITION AND DISTILLATION

Yukio Tsuboi; Yoshio Ueda; Tazuo Ota, and Mikio Yoneoka, all of Niigata, Japan, assignors to Japan Gas-Chemical Company, Inc., Tokyo, Japan

Filed Apr. 2, 1970, Ser. No. 25,264
Int. Cl. B01d *3/34*; C07c *87/28*
U.S. Cl. 203—29 9 Claims

A high-purity xylylenediamine containing particularly neither phthalonitrile nor cyanobenzylamine is produced from the raw xylylenediamine obtained by the hydrogenation of a phthalonitrile, by heating said raw xylylenediamine in the presence of water or an alcohol after the addition of an alkaline agent such as alkali metals, alkaline earth metals, or alkaline compounds thereof, and then distilling the mixture to recover said high-purity xylylenediamine. The high-purity


PHTHALONITRILE
LIQUID AMMONIA
SOLVENT CATALYST
HYDROGEN
BATCHWISE OR CONTINUOUS HYDROGENATION
PRESENT INVENTION
HYDROGEN REMOVAL
AMMONIA REMOVAL
CATALYST SEPARATION*
SOLVENT REMOVAL**
REMOVAL OF LOWER HIGH BOILING COMPONENTS
ADDITION OF ALKALI AND WATER OR ALCOHOL
HEATING
RECTIFICATION
* NOT NECESSARY IN FIXED BED.
** WHEN THE ADDITION SOLVENT IS WATER OR A MONOHYDRIC ALCOHOL HAVING FROM 1 TO 4 CARBON ATOMS, THE SOLVENT IS REMOVED OR A PORTION THEREOF IS REMOVED, OR A PORTION THEREOF IS LEFT.
*** WHEN THE SOLVENT IS WATER OR A MONOHYDRIC ALCOHOL HAVING A PORTION THEREOF REMAINING, THIS PORTION OF SOLVENT OR THE ADMINISTRATIVE PROCESS IS NOT REQUIRED.

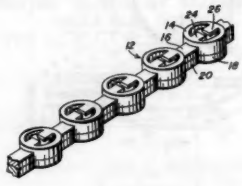
xylylenediamine obtained is particularly suitable for the production of polyamide fibers.

3,647,055

ARTICLE PACKAGING AND HANDLING CHAIN

Wayne K. Pfaff, P. O. Box 5026, Irving, Tex.

Filed Mar. 4, 1970, Ser. No. 16,344
Int. Cl. A45c *11/00*
U.S. Cl. 206—1 R 1 Claim



A series of resilient receptacles are interconnected by connective strips forming a chainlike structure. Each receptacle includes an opened end having diametrically confronting spaced tab elements which normally occlude the opened end. Upon application of distorting forces to a receptacle, the tabs are spread apart to allow insertion of an article. Upon removal of the forces, the tabular elements spring back into their occluding position thereby preventing the article from inadvertent removal.

3,647,056

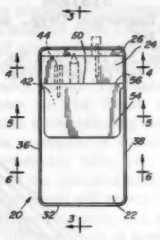
SAFETY GLASSES CASE WITH ID CARD HOLDER AND PENCIL-CARRYING POCKET PROTECTOR

Arthur F. Jacobson, 1281 Lynn Terrace, Highland Park, Ill., and Harold D. Jacobson, 720 Gordon Terrace, Chicago, Ill.

Filed Sept. 25, 1970, Ser. No. 75,409
Int. Cl. A45c *11/04*
U.S. Cl. 206—5 3 Claims

A multicompartment envelope of plastic sheet material and defining a glass case holder in conjunction with a pen

and pencil-carrying pocket protector and an identification



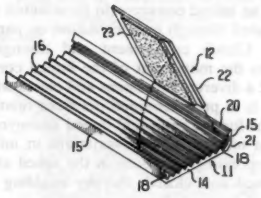
card holding receptacle, the latter having a transparent face and top closure means.

3,647,057

PACKAGE FOR ELONGAT ELEMENTS

Albert S. Ashmead, and Richard W. Shepard, both of Torrington, Conn., assignors to The Torrington Company, Torrington, Conn.

Filed Aug. 13, 1969, Ser. No. 849,641
Int. Cl. B65d *85/24, 43/12, 21/02*
U.S. Cl. 206—17 1 Claim



This disclosure relates to a package for sewing machine needles and similar elongated elements or parts wherein the package includes a generally channel-shaped cross-sectional container which may be readily extruded in continuous lengths and chopped to size, and a cooperating cover. The container includes a face having a plurality of longitudinally extending grooves formed therein for receiving elongated elements and the cover is slidably positioned in opposed grooves formed in sidewalls of the container with the underside of the cover being provided with a resilient material for compressively engaging elongated elements seated in the grooves.

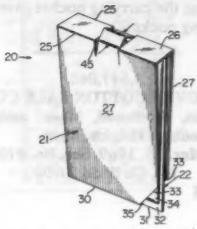
3,647,058

CARTON AND BLANK FOR MAKING SAME

Melville T. Farguhar, Bon Air, Va., assignor to Reynolds Metals Company, Richmond, Va.

Filed Nov. 10, 1969, Ser. No. 875,087
Int. Cl. B65d *79/00, 83/06*
U.S. Cl. 206—56 AC 10 Claims

A protective carton having a wall interconnecting a pair of sidewalls and having open ends wherein the interconnecting wall is provided with a pair of parallel cuts extending completely across the central portion thereof with the sidewalls each having a pair of slits and with the slits of each pair each adjoining an end of an associated cut. The interconnecting wall also has weakening means therein extending between and roughly perpendicular to the cuts. The cuts and slits define a U-shaped construction which because of the presence of the weakening means is easily compressed in the form of a V-shaped construction to define an integral handle for the carton. A plurality of cartons identical to the above-described carton and each having a pouch supported therein so as to define an associated package may be tightly packed in an associated traylike container with the interconnecting walls of the cartons arranged immediately adjacent each



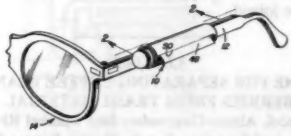
other in a common plane and each package may be easily removed from the container by compressing the U-shaped construction of its associated carton to thereby define a V-shaped construction which serves as an easily grasped handle for lifting the package from within the container.

3,647,059

ACCESSORY RECEPTACLE

Thomas F. Humphreys, P. O. Box 886, Joliet, Ill.

Filed Oct. 2, 1969, Ser. No. 863,293
Int. Cl. B65h *55/00*
U.S. Cl. 206—58 3 Claims



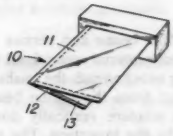
A hollow cylindrical accessory receptacle is mounted on a temple of a pair of eyeglasses. A core is axially formed in the housing and mounts a roll of lens-cleaning material. A slit is also formed in the housing which permits withdrawal and dispensing of a desired quantity of the rolled material.

3,647,060

ROLL OF DOUBLE-POCKETED BAG STRUCTURES

Robert R. Kiely, Pittsford, N.Y., assignor to Mobil Oil Corporation

Filed Mar. 25, 1969, Ser. No. 810,280
Int. Cl. B65d *83/00*
U.S. Cl. 206—58 2 Claims



A double-pocketed bag structure comprising a carrying pocket, a retaining pocket, and a web of material interconnecting the pockets and being unitary with the backwalls thereof. The total height of the web and the retaining pocket being less than the total height of the carrying pocket. The bag structure being further characterized by being joined

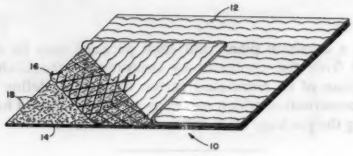
together with identical bags into a continuous roll; the structures being defined by heat seals along their height dimensions, and a tear line being located between adjacent structures. The continuous roll of bag structures, for ease of dispensing and detachment of individual bags, being folded in the web area so that the carrying pocket overlies and extends beyond the retaining pocket.

3,647,061

NONWOVEN COTTON BALE COVER

William B. Kaupin, Westwood, Mass., assignor to Ludlow Corporation, Needham Heights, Mass.

Filed Mar. 25, 1969, Ser. No. 810,307
Int. Cl. B65d *71/00*
U.S. Cl. 206—83.5 **6 Claims**



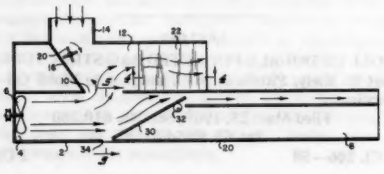
A nonwoven cotton bale cover is a bonded laminate of three layers of material. A layer of net is sandwiched between an outer layer of paper towelling and an inner layer of nonwoven cotton. The layers are bonded by means of a thermoplastic material applied to the outer or inner layer before they are joined.

3,647,062

MACHINE FOR SEPARATING COFFEE BEANS AND BERRIES FROM TRASH MATERIAL

Luis E. Cancel, Alamo-Guaynabo; Jose Manuel Rivera-Ortiz, Bayamon, and Francisco Garcia-Rivera, Bayroa-Caguas, all of P.R., assignors to Commonwealth of Puerto Rico

Filed Nov. 2, 1970, Ser. No. 85,975
Int. Cl. B07b *3/00*
U.S. Cl. 209—3 **5 Claims**



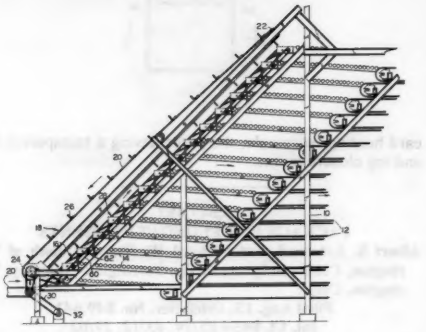
A mixture of coffee beans and berries with twigs, leaves, snails and other trash material is obtained when coffee is harvested by spreading nets beneath the bushes. The trash in this mixture is separated from the coffee beans and berries by pouring the entire mixture vertically downwardly into the machine provided by the invention. The mixture falls into a forced updraft of air which is sufficiently strong that the coffee beans and berries and the heavier components of the mixture fall through it by gravity but leaves and other lighter components will not fall through it and are removed by the updraft. The components that fall through the updraft impinge on the inclined vibrating surface which is located in a stream of air, and the coffee beans and berries are separated from the high-density components of the mixture at this point.

3,647,063

CLUTCH-OPERATED DIVERTER FOR SORTING SYSTEM

Daniel S. Rowley, Beaverton, Oreg., assignor to Irvington Forest Industries, Inc.

Filed Dec. 30, 1969, Ser. No. 889,220
Int. Cl. B07c *5/38*
U.S. Cl. 209—74 **28 Claims**



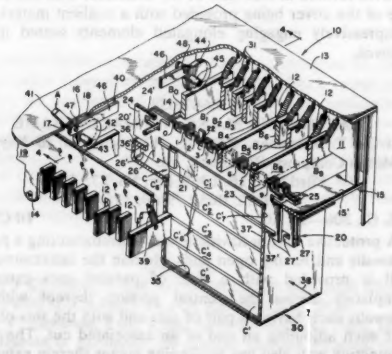
Diverter gates for diverting lumber, logs or similar products from an infeed conveyor to preselected sorting stations are operated through one-revolution or partial-revolution clutches. Clutch engagement and disengagement is synchronized to the movement of the infeed conveyor in a manner so that a diverter gate opens and closes when a piece to be diverted is in predetermined positions relative to such gate. The drives for the gates and infeed conveyor are interconnected in a manner so that variations in infeed speeds result in corresponding variations in the speed at which the gates are opened and closed, thereby enabling high-speed sorting.

3,647,064

INFORMATION CARRIER SELECTION SYSTEM

Norman J. Rosenburgh, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 13, 1970, Ser. No. 36,821
Int. Cl. B07c *5/00*
U.S. Cl. 209—80.5 **10 Claims**



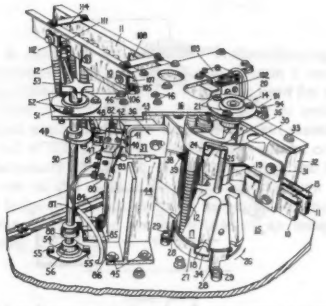
An apparatus for positively separating preselected information carriers from an arrangement of similar carriers, includes a frame and a container, and is adapted to be used

with a plurality of selector tabs releasably suspended from the frame and releasably suspending the container. A plurality of information carriers are symmetrically supported within the container and are respectively connected in sliding frictional relation to the selector tabs. Each selector tab has an edge configuration of alternative lands and notches that is coded to identify a respectively connected carrier by removing preselected of such lands. To make a selection, appropriate selector bars on the frame are actuated to a blocking position within corresponding notches of the coded selector tabs, and the container is shifted one notch pitch. The selected carrier selector tabs, i.e., those which have lands removed adjacent the actuated selector bars, will move with the shifted container and will remain fixed thereto while releasing from the frame. However, the selector tabs of the nonselected carriers will each have at least one of their lands blocked by an actuated selector bar. The blocked selector tabs will be prevented from moving with the shifted container and will release therefrom while remaining suspended from the frame. The selected carriers whose selector tabs have been released from the frame are then positively separated from the suspended arrangement of nonselected carriers in response to movement of the container away from such arrangement.

3,647,065
BOBBIN SELECTOR DEVICE

Charles Perry Powell, Westboro, Mass., assignor to North American Rockwell Corporation, Pittsburgh, Pa.

Filed May 4, 1970, Ser. No. 34,014
Int. Cl. B07c *1/10*
U.S. Cl. 209—88 **3 Claims**



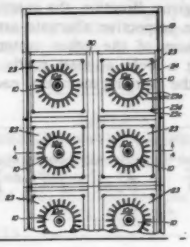
A bobbin selector device having a mechanism for detecting a bobbin not fully stripped of its yarn and for automatically removing an incompletely stripped bobbin.

3,647,066
FLOTATION MACHINE AND SYSTEM UTILIZING IMPELLER-TYPE AERATION UNITS

John T. Potts; Lawrence H. Lange, and Thomas P. Liss, all of Salt Lake City, Utah, assignors to The Galigher Company, Salt Lake City, Utah

Continuation of application Ser. No. 608,339, Jan. 10, 1967, now abandoned. This application June 13, 1969, Ser. No. 835,296
Int. Cl. B03d *1/16*
U.S. Cl. 209—169 **7 Claims**

A flotation machine comprising multiple rows of aligned but mutually independent aeration impeller units and respective stators arranged in spaced side-by-side relationship in a straight line substantially normal to the longitudinal across the width of a flotation tank, as well as along the length thereof, for complete independent local pulp circulation, respectively, so there is mutual impingement of the impeller discharges of aerated flotation pulp across the width of the tank, with recirculation of the resulting pulp and consequent

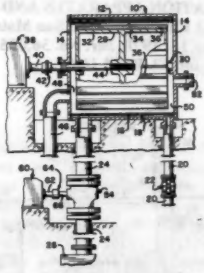


unusually effective pulp aeration that might be appropriately termed "superaeration."

3,647,067
SCREENING APPARATUS HAVING REJECTS CONTROLLING MEANS

Karl E. Vogel, Hollis, N.H., assignor to Improved Machinery Inc., Nashua, N.H.

Filed Feb. 24, 1970, Ser. No. 13,558
Int. Cl. B02b *1/24*
U.S. Cl. 209—242 **10 Claims**



Screening apparatus having a valve in the rejects conduit controlling the discharge of material therethrough. The valve includes a plurality of chambers separated by a wall containing one or more openings of smaller cross section than the chambers and is rotatably driven at a predetermined speed by a drive motor to alternately connect each chamber to the upstream portion of the rejects conduit while the other chamber is connected to the downstream portion of such conduit. The drive motor is reversible to automatically reverse the direction of rotation of the valve in the event that the latter, during rotation in either rotary direction, becomes jammed by rejected material; and a valve in the inlet conduit of the screening apparatus is automatically closed when the first-mentioned valve is not in operation.

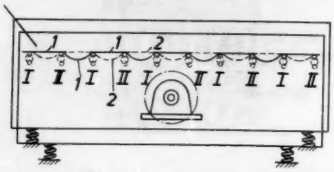
3,647,068
CARRYING MEMBERS FOR DEFORMING WEB SCREENS

Albert Wehner, Weberstrasse 31, Monheim (Rhine), Germany

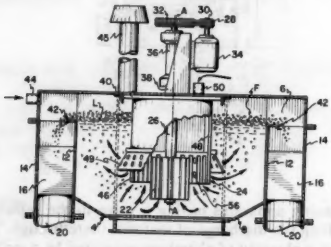
Continuation of application Ser. No. 488,964, Sept. 21, 1965, now abandoned. This application Nov. 25, 1968, Ser. No. 778,857
Claims priority, application Germany, Sept. 26, 1964, W 37612
Int. Cl. B07b *1/42, 1/54*
U.S. Cl. 209—310 **14 Claims**

Screening mechanism includes two systems of screen-carrying members, the two systems, in static condition thereof,

extending in substantially the same horizontal plane, the carrying members being disposed spaced from one another in a given direction and substantially in transverse alignment with one another in the given direction, the carrying members of one system being in respective alternate arrangement with the carrying members of the other system, a screening member comprising a web, at least partly deformable by gravity, carried by the carrying members, each of the carrying members of one of the systems being connected by the screening member to the carrying members of the other system adjacent thereto, and means for relatively moving the two systems in the given direction whereby the spacing between the adjacent carrying members is continually varied in the dynamic condition of the systems, and the screening member is deformed in accordance with the varied spacing between the carrying members.



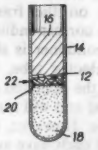
3,647,069
ENCLOSED FLOTATION APPARATUS AND PROCESS
Robert S. Bailey, 3712 Kingridge Drive, San Mateo, Calif.
Filed May 11, 1970, Ser. No. 36,025
Int. Cl. B03d *1/00*
U.S. Cl. 210—44 **8 Claims**



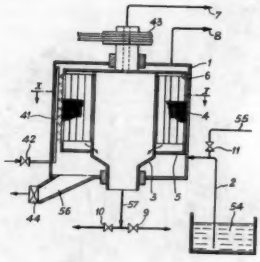
Combined deaeration and flotation apparatus which includes an enclosed tank adapted to contain a body of liquid with an overlying freeboard space. Means for introducing oxygen-free gas into the freeboard space and means for inducting and dispersing the gas into the liquid are also provided. By means of the above apparatus, oxygen is displaced from the liquid and solids are assisted to the liquid's surface for floating whereby both solids and oxygen are separated to produce a clarified liquid of reduced oxygen content Efficiency of operation can be improved by maintaining the gas in the freeboard spaced at a pressure slightly above atmospheric.

3,647,070
METHOD AND APPARATUS FOR THE PROVISION OF FLUID INTERFACE BARRIERS
Stanford L. Adler, Monsey, N.Y., assignor to Technicon Corporation, Tarrytown, N.Y.
Filed June 11, 1970, Ser. No. 47,495
Int. Cl. B01d *21/26*
U.S. Cl. 210—83 **7 Claims**

New and improved method and apparatus for the provision of a satisfactory physical and chemical barrier at a fluid interface in the nature of that which occurs at the interface of the separated plasma and packed cells layers in centrifuged blood samples are provided, and are embodied by barrier means which are of greater specific gravity than said blood plasma layer but lesser specific gravity than said blood cells layer and are operable, upon insertion into a centrifuged blood sample container, to sink through said blood plasma layer substantially to said interface and to be wetted and expanded by said blood plasma to expand into firm contact with each other and with the walls of said container to automatically form said barrier at said interface.



3,647,071
APPARATUS FOR CLARIFYING LIQUIDS CONTAMINATED BY MATERIALS IN SUSPENSION, MORE PARTICULARLY WASTE WATER FROM PAPER MACHINES
Pierre Lamort, 47 rue du Bac 51, Vitry-le-Francois, France
Filed Aug. 6, 1969, Ser. No. 847,882
Claims priority, application France, Aug. 7, 1968, 162168
Int. Cl. B01d *33/02*
U.S. Cl. 210—107 **9 Claims**



A filtering apparatus for batchwise operation in which a tank contains filter means in the path of liquid to be filtered the downstream side of the filter means communicating with a filtrate collector and jets for directing a liquid on to the filter means after a batch has been processed, to dislodge the extract from the filter means.

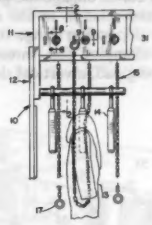
ERRATA

For Classes 210—150 and 210—500 see:
Patent Nos. 3,647,081 thru 3,647,086

3,647,072
GARMENT HANGER LOCK MECHANISM
Herman D. Strang, 308 Ridge, Algonquin, Ill.
Filed May 7, 1970, Ser. No. 35,397
Int. Cl. E05b *73/00*
U.S. Cl. 211—4 **3 Claims**

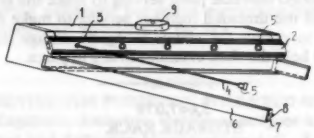
A locking device capable of being readily converted from a coin controlled to noncoin controlled condition. The extension and retraction of a locking hook or bolt is controlled by a key-operated drum cam which has means for receiving and

positioning a coin thereon. A preferred embodiment includes a manually releasable drum-lock which can also be cammed



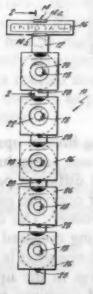
by a coin in operating position on the drum out of drum-locking position when a key is turned.

3,647,073
EXTENSIBLE CLOTHES HANGING DEVICE
Walter Steiner, Oberseenerstrasse 14, Winterthur, Switzerland
Filed Sept. 2, 1969, Ser. No. 854,689
Claims priority, application Switzerland, Sept. 5, 1968, 13,394/68
Int. Cl. B65h *75/48*; D06f *53/00*
U.S. Cl. 211—1.3 **8 Claims**



There is disclosed an extensible clothes-hanging device which comprises a housing containing therein a number of wound-up clothes lines, spring action being used for winding-up such clothes lines. The respective outer free ends of the clothes lines are retained in a ledge or bracket member, and with the aid of such, all of the clothes lines can be conjointly or simultaneously drawn out or extended from the housing. At least one of the clothes lines can be withdrawn without using the ledge or bracket member, and such last-mentioned clothes line is subjected to the action of an independent return spring.

3,647,074
RECORD RACK
Arthur Talmadge, 15 Richbell Road, Scarodale, N.Y.
Filed Mar. 3, 1971, Ser. No. 120,445
Int. Cl. A47b *81/06*
U.S. Cl. 211—40 **3 Claims**



A record rack display assembly for displaying 45 r.p.m. records within their individual paper protective jackets. A backing member is provided with a plurality of projecting spindles for mounting 45 r.p.m. records in a vertical plane. Each spindle has an associated pin member disposed below said spindle a distance equal to slightly more than the radial length of said records so that the paper protective jackets which are slightly larger than the diameter of the records rest on said associated pin member.

3,647,075
SHELF CONSTRUCTION FOR A REFRIGERATOR DOOR
John R. Aue, Columbus, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Apr. 30, 1970, Ser. No. 33,433
Int. Cl. A47f *5/00*
U.S. Cl. 211—153 **7 Claims**

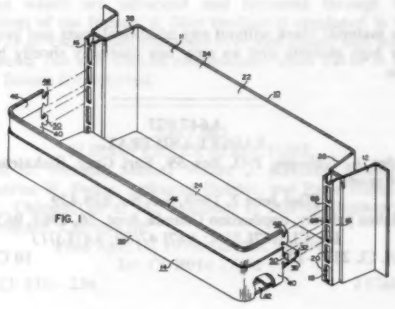


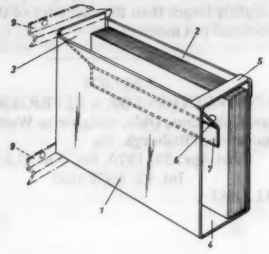
FIG. 1

A refrigerator door shelf is formed from a single piece of metallic sheet metal bent into an L-shape along its width to form the front wall and bottom of the shelf and bent into a general U-shape along the front wall to form the end walls of the shelf. A bent over tab is provided at the bottom termination of each of the end walls or legs forming the U-shape so that the bottom and end walls of the shelf may be riveted together to form a substantially rigid structure. The shelf is secured to a pair of stringer members extending in a vertical direction on and attached to the refrigerator door. The stringers include a series of vertically aligned rectangular apertures so that the shelf may be placed at varying heights on the refrigerator door. The shelf includes a pair of hooked portions at the inward termination of each of the end walls, with each of these hooked portions including upper and lower projections so that the shelf may be engaged in pairs of the vertical aligned apertures so as to not be easily accidentally knocked from its connection with the stringer members.

3,647,076
LATERAL FILE
Egon Heimann, Walkenberg 61, 5600 Wuppertal-Elberfeld, Germany
Filed Nov. 12, 1969, Ser. No. 870,533
Claims priority, application Germany, Feb. 12, 1969, P 19 06 854.3
Int. Cl. A47f *5/08*
U.S. Cl. 211—88 **6 Claims**

A lateral filing system comprising a file box fashioned from a folding blank with holding means projecting beyond the back part of said box and fixed rails to hold the file boxes. The holding means are formed by a tongue cut free from said blank that is folded in a double-layer manner. Said tongue fits behind an upper web of a Z-shaped rail while the lower part of the box rests on a lower web of a parallelly arranged similar rail.

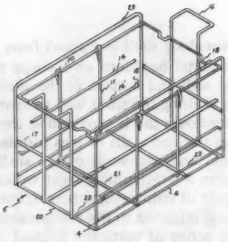
A supporting flap extending from a sidewall of the filing box is designed to press the inserted documents against one sidewall. The invention assures simple fabrication from a single material blank without any additional parts and provides for high stability and an easy box assembly shortly before use.



3,647,077
BASKET AND TRAY

Helen A. Gillespie, P.O. Box 59, Earl Grey, Saskatchewan, Canada

Filed June 2, 1969, Ser. No. 829,429
Claims priority, application Canada, Sept. 26, 1969, 063,183
Int. Cl. A47f 3/14; A47j 47/00; A47f 5/13
U.S. Cl. 211—126 **10 Claims**



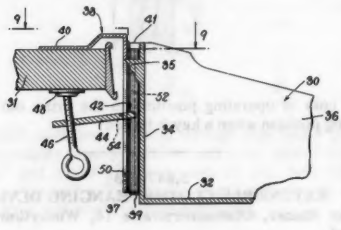
This invention is directed to an openwork basket or container most commonly made of wire and which has pivotable portions that enable one to make from a basket, a basket and tray, or a unit of trays. The pivotable portions are generally the sidewalls or sidewall portions as the case may be and are pivoted inwardly to a substantially horizontal position and retained in the normal confines of the basket, functioning in this position as the bottom of a newly formed tray or smaller basket for supporting articles. A removable-type sidewall portion may be added by placing it in a vertical position covering the opening created by the pivoted sidewall portion and thereby forming an enclosed compartment for retention of articles during rough handling.

3,647,078
SHELF EXTENDER

Vincent Fortunato, Valley Stream, N.Y., assignor to Henschel-Steinau Co., Palisades Park, N.J.

Filed July 27, 1970, Ser. No. 58,469
Int. Cl. A47f 3/14, 5/08; E06b 7/28
U.S. Cl. 211—134 **15 Claims**

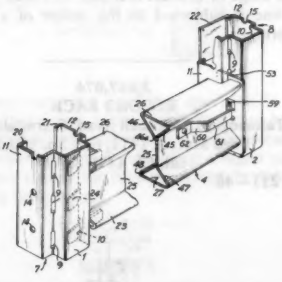
A shelf extender for presenting product to the purchaser forward of a shelf having a container for holding and displaying the product, the container having a rear wall with at least one lip projecting from its rear surface shaped to form a groove between the rear surface and the lip, a clamp having a rear plate having an ear to engage the groove, means to hold the rear plate in fixed relation to the container, the clamp having a rearwardly depending flange to engage the top surface of the shelf, a clamping pad, threaded adjusting means affixed to the clamping pad, a vertical slot in the rear plate, a slotted, movable plate shaped to move in the vertical slot and having a threaded opening therein to receive the adjusting means, the clamping pad engaging the lower surface of the shelf, the slotted movable plate serving to make the gross adjustment and the threaded member serving to make the fine adjustment to permit the clamp to rigidly engage the shelf and thereby hold the shelf extender firmly in place.



3,647,079
STORAGE RACK

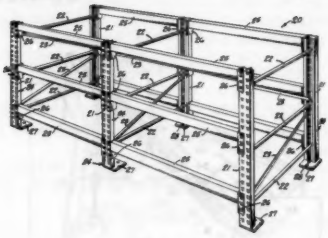
Bror Eric Gustav Ohlin, Saffle, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed May 7, 1970, Ser. No. 35,313
Claims priority, application Sweden, May 9, 1969, 6594/69
Int. Cl. A47f 5/10
U.S. Cl. 211—176 **1 Claim**



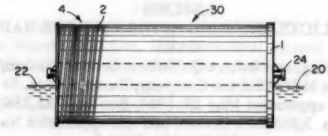
A storage rack having hollow uprights and goods supporting beams therebetween detachably connected to the uprights in a variety of different positions. The beams have mounting hooks at their opposite ends which are constructed differently from one another. The uprights have bent-in wall sections defining opposing recessed corners in each of which a vertical row of spaced openings is provided. The two sets of vertical rows of openings in the uprights are different from one another, one set of openings only being able to receive hooks of one kind at one end of the beams and the other set of openings only being able to receive hooks of another kind at the opposite end of the beams.

3,647,080
STRUCTURAL ELEMENT AND STRUCTURE
Denny A. Denny, Dallas, Tex., assignor to Inca Metal Products Corporation, Carrollton, Tex.
Filed June 12, 1970, Ser. No. 45,631
Int. Cl. A47f 5/10
U.S. Cl. 211—176 27 Claims



A supporting column member for use in sectional shelving, racks, scaffolding and the like, of the knockdown or point of use type. A truss supporting assembly constructed by use of such columnar elements, and a rack or shelving structure formed by means of the elements and the truss assemblies and having adjustable horizontal supporting beams for supporting shelving, walkways or the like.

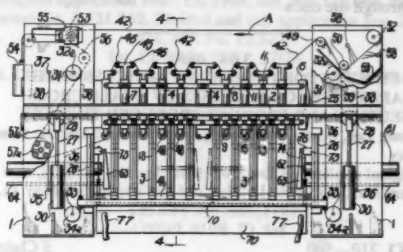
3,647,081
DEVICE FOR PURIFYING POLLUTED WATER
Fritz Engelbart, Anderten, Germany, assignor to Orenstein-Koppel and Lubecker Maschinenbau A.G., Lubeck, Germany
Filed Aug. 19, 1969, Ser. No. 851,376
Int. Cl. B01d 21/00
U.S. Cl. 210—150 9 Claims



A device for purifying polluted water comprises an immersion body having a surface which provides a receiver of biological turf and which is continuously alternately immersed in the water to be purified and brought in contact with air. The body comprises a reel or drum on the surface of which is wound a hose of a stable cross section and preferably extending in helical multiple superposed layers. The drum is advantageously arranged horizontally within the water to be treated and is rotated about its horizontal axis to cause the layers of hose thereon to periodically dip into and out of the water to be treated.

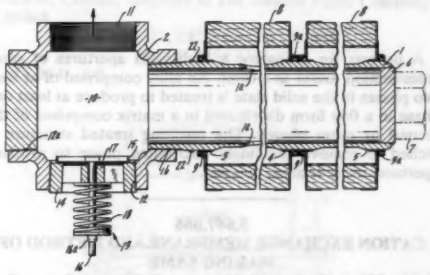
3,647,082
FILTER PRESS
Eiichi Ishigaki, Sakaide, Japan, assignor to Ishigaki Kiko Co., Ltd., Tokyo, Japan
Filed Oct. 22, 1969, Ser. No. 868,362
Claims priority, application Japan, Nov. 2, 1968, 43/80143
Int. Cl. B01d 25/32
U.S. Cl. 210—225 9 Claims

A filter press which includes a plurality of separated filter frames and filter plates maintained in juxtaposed assembly. Means are provided which permit the withdrawal of said filter frames out of the clearances space between the filter plates in such a manner that the filter frames are maintained in parallel arrangement. Removal of the cakes formed during filtration from the filter frames is effected by discharging



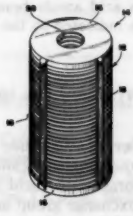
means which are advanced and retreated through the openings of the frames. A filter medium is employed in the form of an endless belt entrained over said plates, said medium being run and washed continuously when cakes in the filter frames are removed.

3,647,083
SLIP-ON FILTER STRUCTURE
Forest G. Niccum, Skokie; Walter J. Kudlaty, Elmhurst; Charles W. Dauer, Arlington Heights, and Peter Heinrich, Jr., Chicago, all of Ill., assignors to Marvel Engineering Company, Chicago, Ill.
Filed Apr. 16, 1970, Ser. No. 29,104
Int. Cl. B01d 27/06
U.S. Cl. 210—236 2 Claims



A filter assembly having a normally fixed core and manually replaceable filter elements.

3,647,084
FILTER
Henry Woods Martin, Houston, Tex., assignor to William W. Nugent & Co., Inc., Skokie, Ill.
Filed Oct. 17, 1969, Ser. No. 867,242
Int. Cl. B01d 25/18
U.S. Cl. 210—492 5 Claims



A filter having a plurality of axially aligned and axially spaced flat annular discs of filtering material separated by

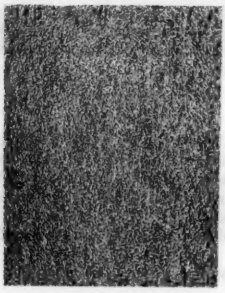
inner and outer support members alternating axially with the respective discs and providing axial support for the discs while defining radial inlet and outlet openings communicating with the spaces between the discs for the flow of fluid axially through the discs.

3,647,085

PROCESS FOR PRODUCING ARTICLES WITH APERTURES OR RECESSES OF SMALL CROSS SECTION AND PRODUCT PRODUCED THEREBY

Daeyong Lee, Scotia, N.Y., assignor to General Electric Company

Original application Dec. 30, 1968, Ser. No. 787,838, now Patent No. 3,615,900. Divided and this application May 11, 1971, Ser. No. 142,262
Int. Cl. B01d 39/00
U.S. Cl. 210—500 5 Claims



A process for preparing a body with apertures of small cross section useful as a filter. An alloy comprised of at least two phases in the solid state is treated to produce at least one phase in a fine form distributed in a matrix comprised of the second or other phases. The resulting treated structure is etched to remove the finely distributed phase to produce apertures or, if desired, recesses.

3,647,086

CATION EXCHANGE MEMBRANE AND METHOD OF MAKING SAME

Yukio Mizutani; Reiichi Yamane; Toshikatsu Sata, all of Tokuyama-shi, and Ryuji Izuo, Kudamatsu-shi, all of Japan, assignors to Tokuyama Soda Kabushiki Kaisha, Tokuyama-shi, Japan

Filed July 9, 1969, Ser. No. 840,513
Int. Cl. B01d 39/16
U.S. Cl. 210—500 11 Claims

A cation exchange membrane comprising a membranous insoluble, infusible organic high-molecular-weight polymer having cation exchange groups chemically bonded thereto and having the dimension of at least 1 centimeter in two directions, the substantial surface of said membrane being chemically bonded with acid amide bonds in a proportion such that the percentage indicated by the following equation is satisfied:

$$A/(A+B)\times 100 = 15 - 10^{-5}\%$$

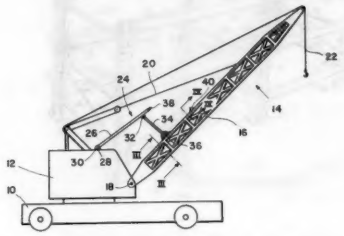
wherein A is the number of acid amide bonds per gram of dry membrane and B is the number of cation exchange groups per gram of dry membrane, said acid amide bonds being composed of a cation exchange group and an amine having one amino group containing at least one hydrogen atom bonded to a nitrogen atom and a method of making the same.

3,647,087

HINGED CRANE BOOM STOPS HAVING CONTROLLED BRAKING MEANS

Ralph Mooney, Mooney Bros. Supply Co., 133 Mahoning Avenue, New Castle, Pa.

Filed Sept. 14, 1970, Ser. No. 71,874
Int. Cl. B66c 23/06
U.S. Cl. 212—59 8 Claims



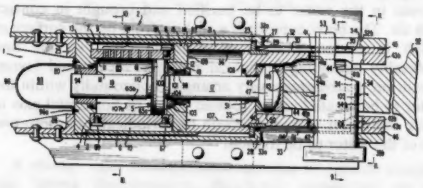
Disclosed is a boom stop arrangement for a crane having a superstructure and a boom pivotally connected thereto for movement in a vertical plane. The boom stop consists of a first strut pivotally connected to the crane superstructure, a second strut pivotally connected to the boom, with the ends of the first and second struts pivotally interconnected, and braking means to control the rotation of one of the struts about its pivotal point. The second strut may include a spring section to provide resiliency and to absorb shock forces. Preferably, the control of the braking means is automatic and operates simultaneously with the boom elevating controls so that the brakes are applied at all times except when the boom is being raised or lowered under operator control.

3,647,088

HYDRAULIC CUSHIONING APPARATUS FOR RAILWAY CARS

Orum E. Seay, and Robert Q. Shelton, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Original application May 27, 1968, Ser. No. 732,236, now Patent No. 3,568,855. Divided and this application Nov. 16, 1970, Ser. No. 89,544
Int. Cl. B61g 9/08, 9/16
U.S. Cl. 213—8 2 Claims

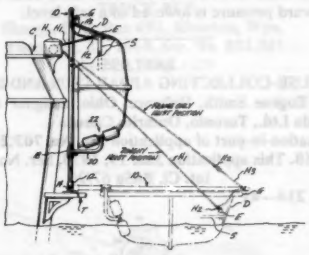


A cushioning apparatus for railway cars, which apparatus includes an hydraulic cylinder fixedly positioned in a sill, a double rod piston mounted in the cylinder and connected by socketed coupling with a drawbar, and a relief valve and return flow check valve arrangement located at least at one cylinder end. A scavenging means is operably disposed adjacent the piston rod and includes an annular fitment means.

3,647,089
DOCKING AND HOISTING DEVICE FOR CRUISER DINGHIES

Orland M. Christensen, Edmonds, Wash., assignor to Christensen, Sanborn & Matthews, Seattle, Wash.

Filed Mar. 30, 1970, Ser. No. 26,181
Int. Cl. B63b *23/06*
U.S. Cl. 214—1 A 9 Claims

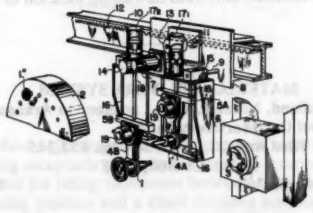


A device for docking and hoisting a cruiser dinghy featuring a pivoted hoistable support frame adapted to rest upon the dinghy afloat, which frame carries depending fender elements which stand the dinghy off transom step or other frame support structure on the cruiser and serve also as arms to support the dinghy on its side in the upraised position of the frame carrying the dinghy. Tension in a hoist line exerted laterally and upwardly at a relatively outboard location on the dinghy from a point on the cruiser snugs the inboard side of the dinghy against the fenders as a first reaction to exerting tension in the hoist line, which condition may be maintained to hold the dingy securely docked and afloat but unhoisted, whereas further drawing in of the hoisting line thereupon raises the dinghy on the support frame in stowed position on the cruiser.

3,647,090
AUTOMATIC TOOL EXCHANGER

Yasuhiro Suzuki, Asa-gun, Hiroshima-ken; Renpei Ikegami, Hiroshima-shi, and Takuo Kishimoto, Asa-gun, Hiroshima-ken, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 24, 1969, Ser. No. 809,656
Int. Cl. B23q *3/157*
U.S. Cl. 214—1 BB 3 Claims

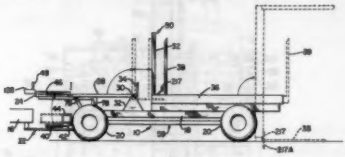


An apparatus for automatically transferring tools between a magazine and a machine tool is arranged to afford movement of a transfer member in three different directions. The tool transfer member is secured to a support frame and is movable in an upward and downward direction. The support frame is movably attached to a carriage which, in turn, is movable along a beam extending between the magazine and the machine tool. The support frame is movable perpendicularly to the vertical plane through which the carriage travels along the beam.

3,647,091
BALE-STACKING APPARATUS

James C. Walters, 2326 Lowell Blvd., Denver, Colo.

Original application Mar. 13, 1968, Ser. No. 712,664, now Patent No. 3,521,762. Divided and this application Jan. 29, 1970, Ser. No. 12,527
Int. Cl. B65g *57/32, 57/28*
U.S. Cl. 214—6 B 8 Claims

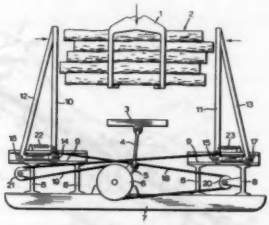


Apparatus to produce butt or stack of bales with bale axes in each layer oriented to achieve best total inertia. Table on trailer receives successive bales from baler, raises each bale to level of positioning bed, and is rotatable about vertical axes to align each bale fore and aft or laterally as desired. First fences moves bale laterally to desired position. Second fence moves rearwardly to push bale onto transfer bed. Loaded transfer bed swings up to deposit the layer on the load bed. Clamp bars are used to compact the bales within each layer. When full stack is completed, load bed tilts to deposit stack upright on ground.

3,647,092
LOG BUNDLE ALIGNER

John Ivan Buiat, and Rudolph Juan, both of Manitouwadge, Ontario, Canada, assignors to The Ontario Paper Company Limited

Filed Mar. 27, 1970, Ser. No. 23,381
Int. Cl. B65g *1/14*
U.S. Cl. 214—6 S 1 Claim



Apparatus for aligning a bundle of logs having two vertical butting plates adapted to be moved toward each other when a bundle of logs held in the customary grappling means is placed upon a pusher plate between the butting plates, the pusher plate being actuated by the downward thrust of the bundle of logs and the grappling means, and by suitable connecting means to cause the butting plates to move toward each other, thus aligning the ends of the logs in substantially the same plane.

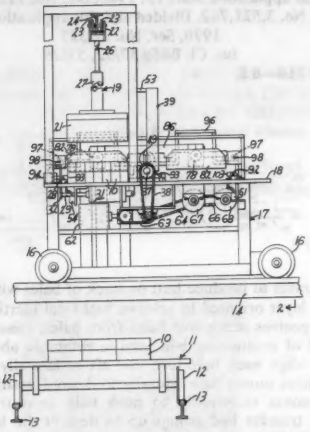
3,647,093
APPARATUS FOR HANDLING ALIGNED ROWS OF OBJECTS

Marion E. Brooks, Columbus, Ga., assignor to Bickerstaff Clay Products Company, Inc.

Filed June 22, 1970, Ser. No. 47,991
Int. Cl. B65g *59/02*
U.S. Cl. 214—8.5 C 7 Claims

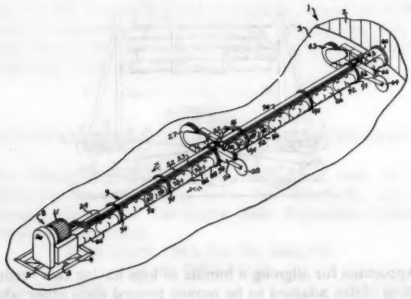
Apparatus positioning aligned rows of objects in horizontal tier with adjacent surfaces in contact and parallel with each

other. Movable conveyor receives tier and moves in increments equal dimension of objects taken in direction of move-



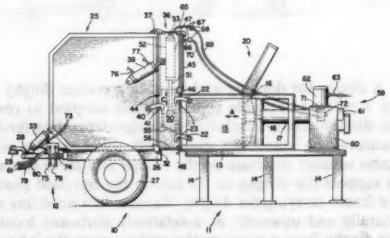
ment. Forwardmost row clamped and moved forward sequentially prior to forward movement of next row.

3,647,094
UNLOADER FOR STORAGE BINS
William J. Jackson, P.O. Box 266, Mendota, Ill.
Filed Oct. 1, 1970, Ser. No. 77,263
Int. Cl. B65g *65/46*
U.S. Cl. 214—17 DA **7 Claims**



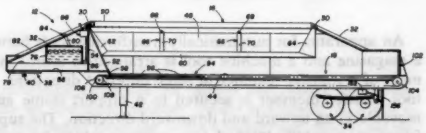
The unloader uses a combination of a plurality of auger and casing units arranged end-to-end and seperably coupled together in a circular bin which has a floor provided with a center outlet sump leading to any means to carry loose granular material from the sump. A power unit connected to the first auger, is mounted in the sump so that it can be rotated on a vertical axis that is on the central axis of the bin. The power unit also includes a hydraulic pump. The casings have openings in one side with manually removable doors for them so that grain may be received by or blocked out of the augers. The first casing carries a tank for hydraulic fluid near the pump. Near the end of the casing remote from the sump, a drive and support unit carries the casing and is hydraulically driven. The second auger and casing unit is seperably coupled to the first auger and casing unit and extends axially beyond it. It also has near its outer end a drive support unit essentially like the one on the first auger. The hydraulic drive coupling to the pump is such that when the first auger and casing unit is separated from the second auger and casing unit, this will limit the supply of fluid to the hydraulic motor of the first drive and support unit so it can be used to cause the first casing unit to travel around the sump and remove the material from the center of the bin while the second unit remains buried in the pile of material in the outer portion of the bin. Unloading a bin by this method keeps the outward pressure on the entire circumference of the bin wall until center annular areas of the bin floor have been cleared and the outward pressure is lowered to a safe level.

3,647,095
REFUSE-COLLECTING APPARATUS AND SYSTEM
Harold Eugene Smith, Defiance, Ohio, assignor to Smithpac Canada Ltd., Toronto, Ontario, Canada
Continuation-in-part of application Ser. No. 703,214, Jan. 18, 1968. This application Jan. 19, 1970, Ser. No. 4,011
Int. Cl. B65g *67/20*
U.S. Cl. 214—41 **10 Claims**



A refuse-collecting apparatus includes a movable unit comprising a wheeled trailer chassis with a refuse-receiving receptacle pivotally mounted thereon for movement between a generally horizontal position and a tilted dumping position. A loading aperture extends through a pivotally mounted tailgate assembly for alignment with a loading chamber of a stationary unit to which the movable unit can be detachably coupled and which is provided at a permanent location such as an apartment building. A loading plunger pushes refuse from within the loading chamber through the loading aperture for compaction by a vertically reciprocable compacting plunger provided in the refuse-receiving receptacle. Flexible hydraulic hoses with quick-disconnect couplings permit operation of the compacting plunger from a hydraulic system provided on the stationary unit for operating the loading plunger as well as permitting operation of a hydraulic-dumping cylinder for moving the refuse-receiving receptacle from a hydraulic system provided on a towing vehicle used for moving the movable unit from its loading location to a refuse dump.

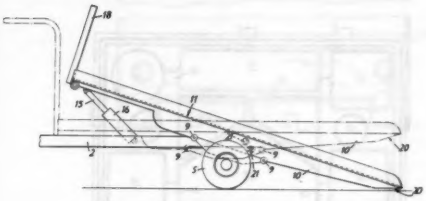
3,647,096
MATERIAL DELIVERY SYSTEM
John H. Holland, Norman, Okla., assignor to Arkansas Rock and Gravel Co., Murfreesboro, Ark.
Filed Aug. 22, 1969, Ser. No. 852,345
Int. Cl. B60p *1/38*
U.S. Cl. 214—83.36 **7 Claims**



A delivery system for hot asphalt includes a plurality of semitrailers. Each trailer includes a V-shaped hopper having an asphalt supporting beam extending longitudinally through it. A tube extends around the hopper for use in spraying

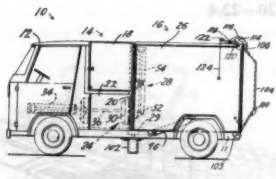
lubricating oil into the hopper prior to the loading of asphalt. Each trailer further includes a conveyor for unloading asphalt from the hopper into a paving machine. The conveyor is driven by a hydraulic motor that is controlled by a valve. The valve is mounted in the trailer for activation by a prod mounted on the paving machine so that the operation of the conveyor is controlled from the paving machine.

3,647,097
TRUCK BED
Preston H. Skaggs, P. O. Box 491, Riverton, Wyo.
Filed Aug. 21, 1969, Ser. No. 851,841
Int. Cl. B60p *1/28*
U.S. Cl. 214—506 **2 Claims**



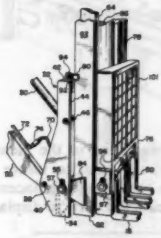
A truck has a load-carrying bed which is mounted on the chassis by a transverse pivot, the load-bearing bed being supported by a road wheel assembly secured to it.

3,647,098
DUMP BODY PIVOT SYSTEM AND LOCK
Harold Eugene Smith, Defiance, Ohio, assignor to Smithpac Canada Ltd., Toronto, Ontario, Canada
Continuation-in-part of application Ser. No. 703,214, June 18, 1968. This application Jan. 19, 1970, Ser. No. 3,788
Int. Cl. B60p *1/04*
U.S. Cl. 214—508 **6 Claims**



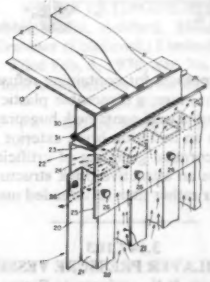
A refuse-collecting apparatus or vehicle includes a refuse-receiving receptacle pivotally mounted on a supporting frame or chassis for tilting movement between a generally horizontal loading position and a tilted dumping position. A loading chamber is provided on the chassis for alignment with a loading aperture in the refuse-receiving receptacle when the latter is disposed in its generally horizontal position. A longitudinally reciprocable loading plunger serves to transfer refuse from the loading chamber into the refuse-receiving receptacle which is pivotally mounted on the chassis by means of pivot pins disposed in elongated slots so that the refuse-receiving receptacle moves a short distance rearwardly out of its loading position to release its sealing engagement with the loading chamber prior to pivotal elevation of the refuse-receiving receptacle into its dumping position.

3,647,099
INTERPOSABLE MAST
Russell F. Carriere, Baraga, Mich., assignor to Pettibone Corporation, Chicago, Ill.
Filed Dec. 11, 1969, Ser. No. 884,255
Int. Cl. B65g *47/00*
U.S. Cl. 214—674 **7 Claims**



Boom-type lift vehicles, including such vehicles already existing, are convertible to boom-mast-type vehicles, by means of a mast having a simple connector system which enables it to replace removable forks leaving pivotal linkages at boom's-end undisturbed. The mast has nonpivoting attachment to a frame which remains pivotally mounted at boom's-end. The replaced forks can be used on the elevator carriage of the mast.

3,647,100
CARGO CONTAINER CONSTRUCTION
Harry M. Russell-French, Philadelphia, Pa., assignor to Boothe Airside Services, Inc.
Filed Dec. 30, 1969, Ser. No. 889,056
Int. Cl. B65d *87/00*
U.S. Cl. 220—1.5 **2 Claims**

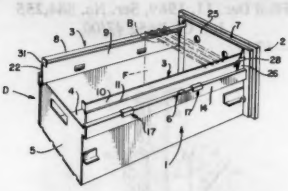


This application discloses a cargo container, especially suited for use in aircraft, which has means providing for ventilation through the walls by the basic structure of the container, specifically by a combination of corrugated wall panels and end rails therefor.

3,647,101
FILING DEVICE
Earl John Hensch, and Leroy Francis Ogilvie, both of Youngstown, Ohio, assignors to The General Fireproofing Company, Youngstown, Ohio
Filed July 29, 1970, Ser. No. 59,078
Int. Cl. B42f *15/00, 17/08*
U.S. Cl. 220—4 R **10 Claims**

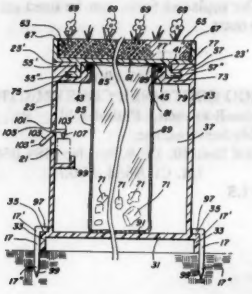
A support member for hanging files is removably attached to the top portion of a drawer and includes a unitary device

provided with transverse elements insertable within a channel at the top of the drawer sidewalls and one or more saddles adapted to rest upon the top of the sidewall channel. Means



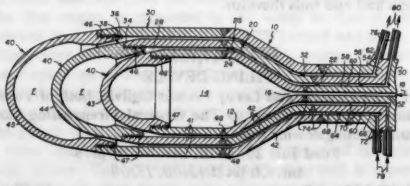
are provided at the forward end of the member engageable with the rear of the drawer head to insure lateral stability while snap fitting means are included adjacent the rear of the member to preclude accidental vertical displacement thereof.

3,647,102
DECORATOR GARBAGE AND TRASH CONTAINER
Michael P. Cooley, Memphis, Tenn.
Filed Jan. 13, 1970, Ser. No. 2,490
Int. Cl. B65d *25/14, 25/38*
U.S. Cl. 220—17 **5 Claims**



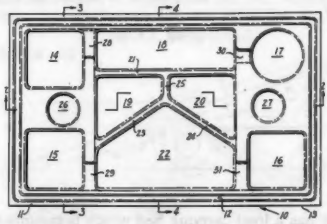
A decorative receptacle for containing refuse and the like having a boxlike structure, a disposable plastic insert, an ornamental cover and a self-contained bugspray bomb. The receptacle includes an imitation brick exterior surface and a cover having a decorative grouping of artificial plants. The container resembles an attractive brick structure serving the purpose of a planter rather than its intended use.

3,647,103
MULTILAYER PRESSURE VESSEL
Irwin Berman, Bronx, N.Y., assignor to Foster Wheeler Corporation, Livingston, N.J.
Filed Dec. 19, 1969, Ser. No. 886,503
Int. Cl. B65d *7/22, 7/40*
U.S. Cl. 220—3 **4 Claims**



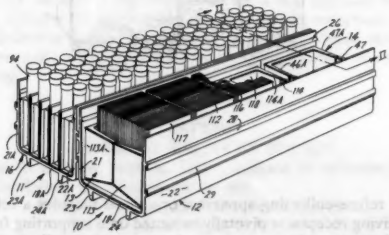
A vessel is provided with a plurality of spaced-apart layers which contain fluid fill and closure means comprising a plurality of layers which are integrally formed with the layers of the pressure vessel. The fluid fill between the layers of the pressure vessel extends into and between closure layers, such that the fluid fill can be maintained under uniform pressure in each layer.

3,647,104
DISPOSABLE TRAY
Harford E. Goings, 5428 Center Drive, Camp Springs, Md.
Filed Feb. 24, 1970, Ser. No. 13,611
Int. Cl. B65d *1/36*
U.S. Cl. 220—20 **2 Claims**



A food tray, pressed or stamped from thin plastic material, provided with dividing partitions for separating the various foods and accessories and provided with a depressed strengthening rib completely encircling the tray.

3,647,105
SET-UP TRAY
Clifford R. Keeslar, Oshtemo Township, Kalamazoo County, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.
Filed May 18, 1970, Ser. No. 38,065
Int. Cl. B65d *21/02, 25/04*
U.S. Cl. 220—23.4 **7 Claims**



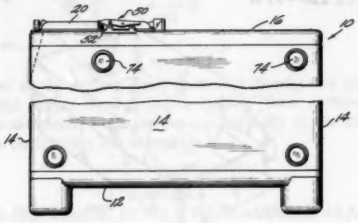
A tray assembly having a channel-shaped base into which plural disposable trays are slidably receivable for holding a variety of articles. Each tray has a bottom wall connected to one or more pairs of cooperating, channel-shaped sidewalls with integral releasable gripping means for releasably holding said sidewalls together to form a recess or compartment which normally opens upwardly. The entire tray can be fabricated by a vacuum molding process from a single sheet of plastic material. Plural trays and plural bases can be interconnected in side-by-side relationship.

3,647,106

BIN WITH IMPROVED DOOR SEAL AND CONTENT RELEASE CHARACTERISTICS

Delmar R. Wiese, Blue Springs, Nebr., assignor to Hoover Ball and Bearing Company, Saline, Mich.

Filed Jan. 13, 1970, Ser. No. 2,468
Int. Cl. B65d *53/00, 43/16*
U.S. Cl. 220—31 R 6 Claims



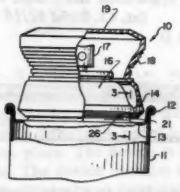
A bin for storing and transporting bulk material having a door seal and latch assembly which prevents accidental escape of material in the bin around the door. Pressure and heat relief safety discs are mounted in a number of openings formed in the bin walls to allow for escape of the bin contents under unusual circumstances which would create dangerous pressure or heat conditions within the bin.

3,647,107

CAP FOR AEROSOL CANS OR THE LIKE

Pascal A. La Grutta, West Caldwell, N.J., assignor to Container Corporation of America, Chicago, Ill.

Filed Dec. 17, 1969, Ser. No. 885,950
Int. Cl. B65d *43/10*
U.S. Cl. 220—60 R 1 Claim



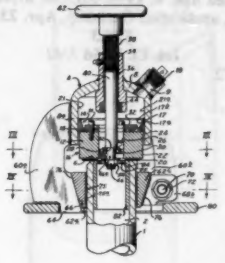
A moulded cap for an aerosol can or the like. The cap is especially adapted for cans of the type having a chimed end closure forming part of the valving assembly and located inboard of the conventional chimed end of the container. The moulded cap has a chime engaging flange characterized by a multiplicity of inward extending projections therefrom each spaced from the next by a thin web of the cap material. The configuration of each projection is such that the cap can be snapped over the chimed end irrespective of distortions in the cap incident to the moulding thereof, and held to the chime periphery at a corresponding multiplicity of contact points, the rather minimal thickness of the wall material between the projections enabling any cap distortions readily to be accommodated.

3,647,108

CLOSURE FOR PRESSURE VESSELS

Norman H. Kemp, 726 Regal Row, Dallas, Tex.

Continuation-in-part of application Ser. No. 729,966, May 17, 1968, now Patent No. 3,498,493, which is a continuation-in-part of application Ser. No. 494,061, Oct. 8, 1965, now Patent No. 3,387,738. This application Jan. 2, 1970, Ser. No. 22
Int. Cl. B65d *53/00*
U.S. Cl. 220—46 23 Claims



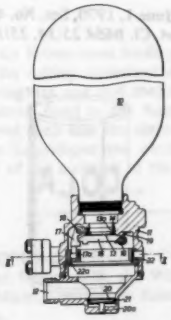
A closure for pressure vessels including a resilient seal ring having an outer lip and an inwardly turned flange angularly disposed to the outer lip whereby pressure within the vessel is exerted through an opening in the seal ring to urge the seal ring into positive sealing relation with the vessel around an opening in the vessel. The closure member has a seal ring receptacle having a plurality of anchor members secured thereto, said anchor members having surfaces engageable with slip rings to urge the slip rings into gripping engagement with a portion of the vessel.

3,647,109

CONTAINERS FOR FLUID UNDER PRESSURE, SUCH AS FIRE EXTINGUISHERS

Peter B. Hebblethwaite, Ashford, Middlesex, England, assignor to Graviner (Colnbrook) Limited, London, England

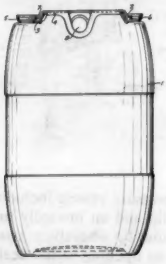
Filed Feb. 5, 1970, Ser. No. 8,984
Claims priority, application Great Britain, Feb. 5, 1969, 6,112/69
Int. Cl. B65d *43/02*
U.S. Cl. 220—47 2 Claims



A fluid container adapted to contain fluid under pressure, has a discharge outlet normally closed by a frangible diaphragm which is supported by a member held in a position at which it prevents bursting of the diaphragm by pressure within the container. A rotary member is coupled to the

diaphragm-supporting member, and means are provided for effecting selective rotation of the rotary member, to free the diaphragm supporting member to move away from the supporting position whereby the diaphragm is no longer supported against bursting.

3,647,110
MOLDED BARREL
Wilhelm Hammes, Much, Germany, assignor to Mauser Kommanditgesellschaft, Colgne-Bayenthal, Germany
Filed Apr. 6, 1970, Ser. No. 27,629
Claims priority, application Germany, Apr. 23, 1969, P 19 20 515.3
Int. Cl. B65d 7/42
U.S. Cl. 220—72 **10 Claims**

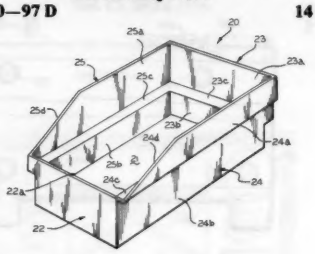


One end wall of a molded barrel of thermoplastic material has a general plane and is provided with at least two depressions at opposite diametric sides. A tubular portion is located in each depression and of one piece with the end wall, each of the tubular portions communicating with the interior of the barrel and terminating in the general plane. Reinforcing webs are provided in the respective depressions at that side of the associated projection which faces at the middle of the one end wall and these reinforcing webs are each of one piece with the one end wall and the respective projection, bridging the respective depression.

3,647,111
BIODEGRADABLE CONTAINER
Francis W. Stager, and Robert N. Minor, both of Stafford Springs, Conn., assignors to Biocor Corporation, Stafford Springs, Conn.
Filed June 1, 1970, Ser. No. 42,010
Int. Cl. B65d 25/34, 25/14
U.S. Cl. 220—83 **20 Claims**

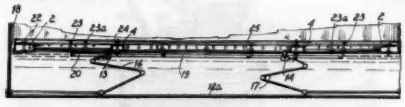
A container which deteriorates after a prolonged exposure to moisture and oxygen in an atmospheric environment with the aid of biological agents. The container material has organic components that are nutrients to fungi and various bacteria which bring about the decomposition. The material is composed of an organic filler material, such as peat, and a phenolic resin impregnated with a metallic salt of a fatty acid. The decomposition process transforms the container material into a rich organic substance which enhances soil characteristics.

3,647,112
NESTABLE CONTAINER
William F. Limbert, Jr., 750 Polk Street, Oconomowoc, Wis.
Filed Feb. 26, 1970, Ser. No. 14,348
Int. Cl. B65j 21/04
U.S. Cl. 220—97 D **14 Claims**



A nestable container including a bottom wall and upstanding sidewalls wherein at least two of the upstanding sidewalls have a cross section such as to include a lower section, an upper section and an interconnecting web section between the upper edge of the lower section and the lower edge of the upper section serving as a nest stop and a wall reenforcement. The upper section of one sidewall is twice the height of the lower section thereof, while the lower section of the other sidewall is twice the height of the upper section thereof. Containers are nested two-thirds their height with each other by having them arranged oppositely end for end.

3,647,113
FLOATING ROOF FOR LIQUID STORAGE TANKS, PARTICULARLY FOR THE STORAGE OF LIQUID PETROLEUM PRODUCTS
Rodolfo Belleli, c/o Rodolfo Belleli and C. S.a.s., Strada Cipata, Zona Industriale, Mantova, Italy
Filed Sept. 2, 1969, Ser. No. 854,540
Claims priority, application Italy, Sept. 4, 1968, 20841 A/68
Int. Cl. B65d 87/18
U.S. Cl. 220—26 D **1 Claim**

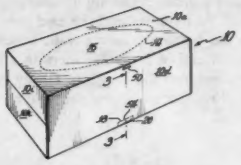


This disclosure relates to a large diameter floating roof for liquid storage tanks which comprises a covering sheetlike member and a peripheral hollow annular pontoon member fixed on the periphery of said sheetlike member and at least one intermediate annular concentric load member arranged to separate a central zone from a peripheral zone of said sheetlike member between said peripheral pontoon member and said intermediate load member.

3,647,114
TISSUE DISPENSER HAVING RESILIENTLY BIASED FOLLOWER
Keith T. Bleuer, 1663 Wilshire Drive N.E., Rochester, Minn.
Filed Dec. 1, 1969, Ser. No. 881,181
Int. Cl. A47k 10/44
U.S. Cl. 221—59 **5 Claims**

A carton of cardboard or the like for a stack of tissues having a tissue-dispensing opening in its top panel and having a

central portion of its bottom panel detachable from the rest of the bottom panel due to a perforation line ringing the bottom panel portion, with a rubber band attached on its ends adjacent the upper edges of the side panels of the carton and



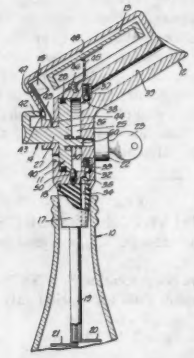
connected to the bottom panel portion at its edges by staples so that the rubber band pulls the bottom panel portion upwardly and thereby pulls the tissues upwardly in the carton when the perforation line is broken.

3,647,115

LIQUID-DISPENSING DEVICE WITH AUDIBLE ALARM

Gerald P. McCann, Glendale, and Frank F. Chase, Glendora, both of Calif., assignors to McCanns Engineering & Mfg. Co., Glendale, Calif.

Filed Mar. 12, 1970, Ser. No. 18,955
Int. Cl. B67d *5/32*
U.S. Cl. 222—39 **14 Claims**



There is disclosed herein a liquid-dispensing device for use with bottles and the like for dispensing measured amounts of liquid and providing a detectable signal indicating that such dispensing has taken place. The device is insertable into and lockable in a bottle. The device includes a positive displacement pump for dispensing a predetermined amount of liquid. A vibrator arrangement is provided for providing signals, the vibrator being actuated each time liquid is dispensed. Vibrations from the vibrator may be sensed in any suitable manner to provide a record of the number of times liquid is dispensed.

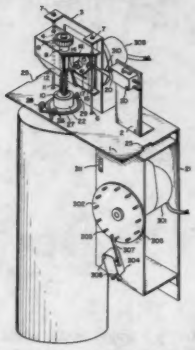
3,647,116

MOUNTING BRACKET FOR PERIODICALLY DISPENSING AEROSOL BOMBS

Dalbro R. Nixon, Jr., Chesapeake; David J. McIlhenny, Suffolk, and Marvin L. Harrell, Portsmouth, all of Va., assignors to Virginia Chemicals Inc., Portsmouth, Va.

Filed Sept. 10, 1970, Ser. No. 71,055
Int. Cl. G04c *23/04*
U.S. Cl. 222—70 **4 Claims**

A mounting bracket for periodically dispensing aerosol bombs of the type having a cylindrical body portion and a neck dispensing portion with a collar and dispensing valve. The mounting bracket includes a feature for support of a clock timing mechanism and an operating slide vertically reciprocated upon two rods and including a spring tension plunger. The operating slide contacts the aerosol-dispensing



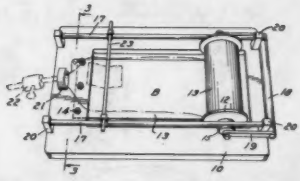
valve and is activated by a cam rotated by the clock timing mechanism. The vertical reciprocation of the slide upon two rods enables a more accurate, more easily adjustable and more reliable discharge of the aerosol bomb at preselected time intervals.

3,647,117

APPARATUS FOR INTRAVENOUS FEEDING AND THE LIKE

Thomas S. Hargest, 1078 Winslow Drive, Charleston, S.C.

Filed Aug. 22, 1969, Ser. No. 852,347
Int. Cl. B65d *35/34*
U.S. Cl. 222—100 **11 Claims**



An apparatus for intravenous feeding comprising a drum that is mounted for rolling movement along a base. A constant tension spring has one end thereof fixed to the drum and one end thereof fixed to the base. A collapsible container is positioned such that the drum under the action of the spring tends to collapse the container uniformly and thereby dispense of the contents of the container out of the container.

3,647,118

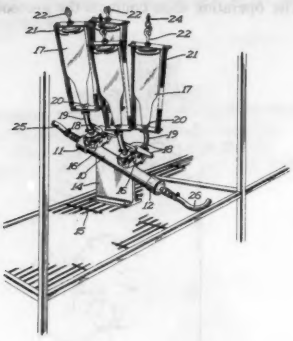
LIQUOR-DISPENSING SYSTEM

James H. Johnson, Minneapolis, and William C. McGuire, St. Paul, both of Minn., assignors to Select Systems, Inc., Minneapolis, Minn.

Filed Aug. 4, 1969, Ser. No. 847,135
Int. Cl. B67d *5/60*
U.S. Cl. 222—145 **4 Claims**

A manifold having one end elevated with respect to the other, liquor bottle connections along its length, an air inlet at the elevated end of the manifold and a liquor outlet at the

lower end of the manifold, is connected to a liquor-metering means. The bottles are connected to the manifold by valves



to permit removing a single bottle while the others are being emptied. The bottles empty sequentially but independently.

3,647,119

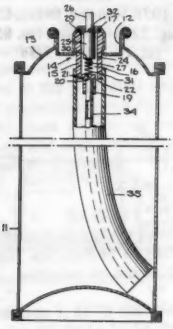
PRESSURIZED PACKAGE

Leon C. Samuelson, Racine, Wis., assignor to S. C. John & Son, Inc., Racine, Wis.

Filed May 26, 1970, Ser. No. 40,636

Int. Cl. B65d *83/14*

U.S. Cl. 222—402.18 **4 Claims**



Pressurized package for dispensing product from upright or inverted position and having means providing vapor tap effect in either position while preventing premature propellant exhaustion, and valve assembly therefor.

3,647,120

MIXING VALVE FOR DISPENSERS

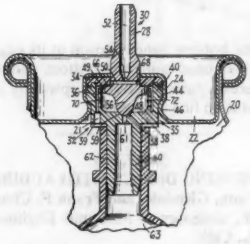
Wolf Steiman, Fairfield, Conn., assignor to VCA Corporation, Greenwich, Conn.

Filed Oct. 28, 1970, Ser. No. 84,840

Int. Cl. B65d *83/14*

U.S. Cl. 222—402.22 **7 Claims**

A tilt action mixing valve having a tiltable valve stem with an upper hollow portion and a side opening at a midway point, constituting a discharge passage. Below the side opening is a valve shoulder, engageable with an annular valve seat through which the hollow stem portion extends, for the purpose of shutting off the flow from within a tubular valve housing to the top of which the annular seat is sealed. The valve housing has two inlet openings, and is mounted at the top of a rigid outer container whose interior communicates with one of said openings. At its bottom the valve housing has the other opening, which communicates with a flexible, collapsible inner container having a different liquid from the outer container. At its inner end the said other opening has a valve seat, in the bottom housing wall, which is engaged by the bottom, solid end of the valve stem to control flow from the inner container into the housing. Tilting of the valve stem permits such flow. Surrounding the valve shoulder of the



stem is a flexible seal skirt or cylinder constituting part of the housing. With the stem not tilted, this skirt seals to the shoulder and isolates the two inlet openings from each other. Tilting of the stem unseats both the stem shoulder and the stem bottom, and unseals the skirt from the shoulder. Pressurized liquid then flows from the two containers into the valve housing and out through the upper hollow portion of the stem, with mixing occurring only within the stem hollow portion. There is no mixing chamber as such, within the valve housing, and therefore no mixed residue remains, after a discharge, within the valve housing.

3,647,121

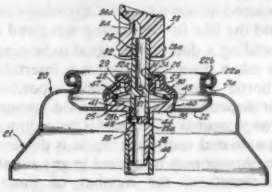
SNAP ACTION VALVE FOR PRESSURIZED PACKAGE

John E. Ayres, Mountainside, N.J., assignor to Acu-Tech Corporation, Union, N.J.

Continuation-in-part of application Ser. No. 805,973, Feb. 24, 1969, now abandoned. This application July 18, 1969, Ser. No. 842,934

Int. Cl. B65d *83/00*

U.S. Cl. 222—402.24 **24 Claims**



A manually operable valve which operates with a snap action is provided for a pressurized package. The valve operates with a snap action in movement of a valve-actuating member between an open position and a closed position with operation of the valve being positive and with an audible indication of such operation being provided.

The valve mechanism includes a seal which is fitted within a dome-shaped recess in a closure cap having an opening therein which is aligned with an opening in the seal. A tubular portion at the upper end of a valve-actuating member extends through the aligned openings and forms a discharge passageway. The tubular portion is engaged by the seal and

contains a discharge port which communicates with the passageway and is closed by the seal in the closed position of the valve-actuating member.

The valve-actuating member carries a downwardly extending, skirtlike flange of a flexible material having a free lower end which rests on and engages with a fixed member and the skirtlike flange flexes with a snap action in operation of the valve. A tubular extension carried by a retainer or adapter cup provides communication with the interior of a container.

The valve-actuating member and the skirtlike flange are formed of a rigid plastic material such as an acetal resin which permits repeated flexing of the skirtlike flange in movement of the valve-actuating member between the open position and the closed position.

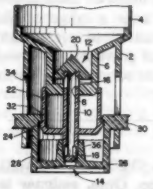
The valve mechanism may also be employed to simultaneously control the discharge from a separate vessel or container within the package and the combining of material from such a vessel with material from the main container at the time discharge from the package takes place.

3,647,122

METERING DISPENSING VALVE

Louis V. Nigro, Saugus, Mass., assignor to The Gillette Company, Boston, Mass.

Filed Oct. 20, 1969, Ser. No. 867,585
Int. Cl. B65d *47/26*
U.S. Cl. 222—501 **5 Claims**



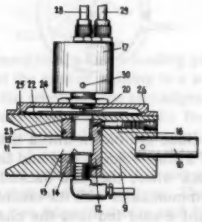
Valve for dispensing a preselected amount of viscuous material from a container. The valve includes a reciprocable tubular portion which delivers a preselected amount of the material from the container upon each stroke.

3,647,123

EDGE-SENSING MECHANISMS

Reuben Medding, North Caulfield, Victoria, and Graham Roland Tyson, Nunawading, Victoria, both of Australia, assignors to Consolidated Electronics (Sales) Proprietary Limited, Brunswick East, Victoria, Australia

Filed Nov. 24, 1969, Ser. No. 879,085
Claims priority, application Australia, Nov. 29, 1968, 47045/68
Int. Cl. B65h *25/08*
U.S. Cl. 226—22 **5 Claims**



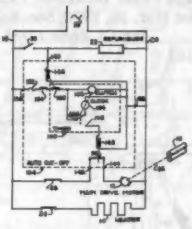
The invention provides a sensitive sensor and system with low response inertia for maintaining the accuracy of the path of a moving web of material and includes in its construction means to facilitate maintenance without the need for subsequent adjustment.

3,647,124

PHOTOGRAPHIC DEVELOPING MACHINE AUTOMATIC CUTOFF

Oliver V. Spicer, Lubbock, Tex., assignor to Swain Rodgers, a part interest

Filed Dec. 29, 1969, Ser. No. 888,716
Int. Cl. B65h *25/32*
U.S. Cl. 226—46 **2 Claims**



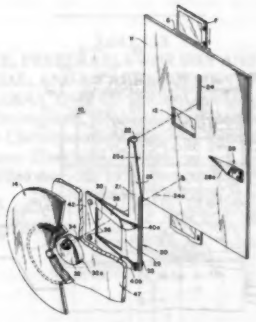
In a machine for processing photographic film, a main switch in the main power supply to the machine is normally held in the closed position so that the machine runs. A timing circuit is reset each time film is fed into the machine. At a set time after the last film is fed into the machine, an electromagnetic solenoid opens the main switch to automatically cut off the machine.

3,647,125

INTERMITTENT FILM-FEEDING MECHANISM

Edward J. Cator, Naples, and William A. Martin, Fairport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 17, 1970, Ser. No. 72,957
Int. Cl. G03b *1/22*
U.S. Cl. 226—62 **3 Claims**



An intermittent film-advancing mechanism is disclosed which comprises a claw member extending along the direction of film movement and having at one end a projection for engaging and disengaging film perforations and at the opposite end a cam follower portion adapted to be engaged by a "Lumiere-type" cam which drives the follower to provide the requisite up-down projection movement. A ramp-type cam slidably engages the claw intermediate its ends and is adapted to reciprocate (in-out) the projection in ap-

propriate portions of an operating cycle in response to up-down movement of the claw. Resilient means coupled to the claw member are provided to constantly urge protrusions formed on the claw member into slidable engagement with a support wall whereby the claw member will pivot about the protrusions when the ramp causes in-out projection movement. Advantageously, this arrangement prevents the claw member from executing arcuate movement.

3,647,126

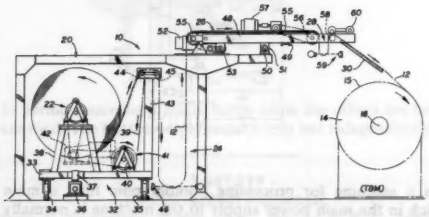
TIRE-FABRIC-HANDLING APPARATUS

Donald B. Dieterich, Cuyahoga Falls, and George L. Schrum, Tallmadge, both of Ohio, assignors to Akron Standard, a division of Eagle Picher Industries, Inc., Cincinnati, Ohio

Filed Mar. 30, 1970, Ser. No. 23,748

Int. Cl. B65h *17/18*

U.S. Cl. 226—105 **2 Claims**



Apparatus for handling large diameter rolls of tire fabric for placement on a tire building drum. Apparatus is floor mounted and fabric is let off at controlled rate and registered laterally for selective delivery to the building drum.

3,647,127

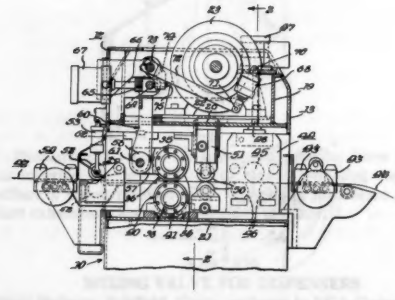
FEEDING APPARATUS FOR STRIP MATERIAL

Chester M. Wiig, Lincolnwood, Ill., assignor to F. J. Littell Machine Company, Chicago, Ill.

Filed Apr. 30, 1970, Ser. No. 33,193

Int. Cl. B65h *17/22*

U.S. Cl. 226—155 **3 Claims**



The intermittent feeding apparatus for strip material as herein disclosed is characterized by feed roll-lifting means which are power operated in an automatic manner to momentarily lift one of the feeding rolls so as to release and free the strip material and which takes place periodically and immediately in advance of a stamping or blanking operation on the material. More particularly the feed rolls are caused to resiliently contact and grip the strip material for a feeding operation by means of a main power cylinder and wherein an auxiliary power cylinder is provided for periodic operation against the main cylinder whereby to separate the feed rolls and release the strip material. During release of the strip material and the same is held against rearward movement by antibackup rolls.

3,647,128

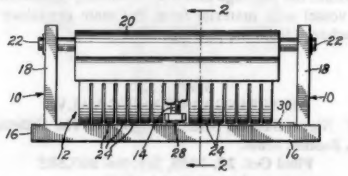
WEB-TENSIONING DEVICE

Gautam C. Shah, Bombay, India, assignor to Burroughs Corporation, Detroit, Mich.

Filed Sept. 17, 1969, Ser. No. 858,716

Int. Cl. B65h *23/10*

U.S. Cl. 226—195 **2 Claims**



The disclosure embodies an elongated shoe for uniformly tensioning a web and includes mechanism for maintaining a preset shoe pressure over a range of web thicknesses. The shoe is pivotally mounted to press transversely downward under the influence of gravity upon a web to an extent permitted by an adjustable screw riding on the web and partially supporting the shoe.

3,647,129

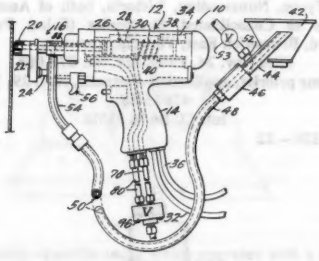
STUD FEEDING SYSTEM FOR WELDING TOOLS

Don. E. Ehrlich, Avon, Ohio, assignor to TRW Inc., Cleveland, Ohio

Original application Oct. 21, 1968, Ser. No. 769,020, now Patent No. 3,526,744. Divided and this application Mar. 13, 1970, Ser. No. 24,474

Int. Cl. B23k *9/00*; B25c *1/04*

U.S. Cl. 227—112 **4 Claims**



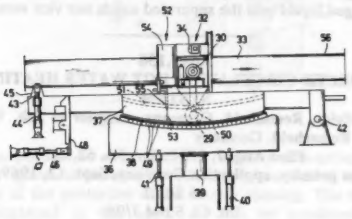
Studs to be welded are blown into a loading chamber behind a chuck of a stud-welding tool and then move into the front of the chuck where they are backed up by a plunger. An air nozzle communicates with the chamber and directs air rearwardly toward a stud fed into the chamber to urge the stud away from the chamber inlet in a manner to substantially eliminate stud jamming. The air preferably is supplied from an air cylinder which drives the plunger.

3,647,130

APPARATUS FOR WELDING SHEET METAL

Siegfried Hahne, Hoesel, Germany, assignor to Messer Griesheim GmbH, Frankfurt am Main, Germany

Filed Feb. 26, 1970, Ser. No. 14,401
Claims priority, application Germany, Mar. 6, 1969, P 19 11 381.6
Int. Cl. B23k *1/20*
U.S. Cl. 228—5 10 Claims



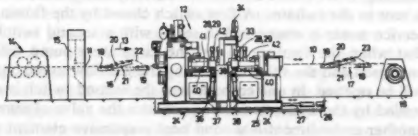
The apparatus comprises a clamping device for gripping the sheets to be welded, and a proper welding device that is combined with the sheet-clamping device to form a first operative unit. This first clamping and welding unit is arranged for displacement in the direction of the feed of the sheets. A heating device adapted for thermal pretreatment and aftertreatment of sheet edges, is combined with a grinding device for leveling the welding joints, to form a second operative unit. This second operative unit is carried by the first operative unit, and further supported for horizontal movement in the direction of the welding joints. The burner of the heating device, and the grinding disc of the grinding device, are vertically adjustable. A sheet gripping device with jaws having arcuate clamping surfaces, is operatively associated with the heating and grinding operative unit.

3,647,131

APPARATUS FOR ARRANGING PARALLEL THE EDGES OF STEEL SHEETS TO BE WELDED

Siegfried Hahne, Hosel, Germany, assignor to Messer Griesheim GmbH, Frankfurt/Main, Germany

Filed Feb. 26, 1970, Ser. No. 14,400
Claims priority, application Germany, Mar. 6, 1969, P 19 11 324.7
Int. Cl. B23k *1/20*
U.S. Cl. 228—5 5 Claims



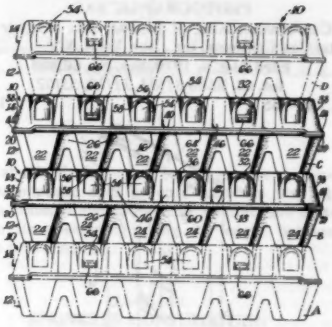
The apparatus comprises a sheet-feeding path extending in front of and behind the area of welding in a welding machine. A shearing device for trimming the end edges of the sheets to be welded is located at the input of the feeding path. The welding machine is supported for movement in the direction of the sheet feeding. A vertically adjustable stop beam is arranged in the area of welding, and the movement thereof is synchronized with that of clamping jaws. The clamping jaws clamp each of the two aligned sheets and feed them to the area of welding. A buckle table is provided for each sheet to produce a band thereon. These bands enable a substantially accurately parallel abutment of the sheet edges against the raised stop beam.

3,647,132

EGG CARTON WITH EXTERIOR WINDOWS

Kenneth L. Crabtree, Fairfield, Maine, assignor to Keyes Fibre Company, Waterville, Maine

Filed Apr. 17, 1970, Ser. No. 29,404
Int. Cl. B65d *1/36*
U.S. Cl. 229—2.5 1 Claim



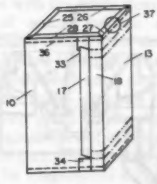
A molded egg carton of the type having a cover which has depending sidewalls with egg viewing windows in the exterior facets to provide a view into all the egg pockets when the carton is viewed from above, as when the carton is the top one in a stack or is held in the hand, and in addition to provide a view into each egg pocket in the row of pockets along one side of the carton when the carton is viewed from that side, as when a number of cartons are stacked one on top of another for display purposes in retail stores and it is thus impossible to view any but the top carton from above. At least the upper part of each window is framed by a portion of the carton cover which is recessed with respect to both the top portion and the sidewalls of the cover, and the carton cover has inwardly recessed buttress structure in the sidewalls and additional support structure extending downwardly from the flat top portion to increase the strength of the carton despite the provision of viewing windows for every egg pocket in the carton.

3,647,133

PACKAGE, PREFERABLY FOR DRY AND FROZEN MATERIAL, AND AN ARRANGEMENT FOR THE PRODUCTION OF SUCH A PACKAGE

Od Wikar Christensson, Bromma, near Stockholm, Sweden, assignor to Christenssons Maskiner & Patenter Aktiebolag, Bromma, near Stockholm, Sweden

Filed Aug. 20, 1970, Ser. No. 65,491
Int. Cl. B65d *5/00, 5/54*
U.S. Cl. 229—37 5 Claims



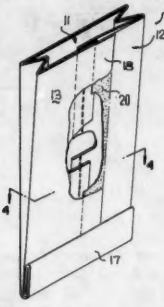
A package of polygonal cross section having a thin end closure closing at least one end. The closure extends over onto and is attached to the sides of the package. Airtightness is improved by attaching the closure such that the end of the

package is bent inwardly at least at the corner, in somewhat the form of a frustrum pyramid. An apparatus for closing such a package comprises a heatable tool having inwardly sloping sides to press the end closure onto the edge of the package end and concurrently force the end into the frustrum pyramid shape.

3,647,134
PHOTOGRAPHIC BAG

Ernest Carnevalino, King of Prussia, Pa., assignor to Continental Can Company, Inc., New York, N.Y.

Filed Aug. 4, 1970, Ser. No. 60,808
Int. Cl. B65d *31/02, 31/10, 33/02*
U.S. Cl. 229—55 **10 Claims**

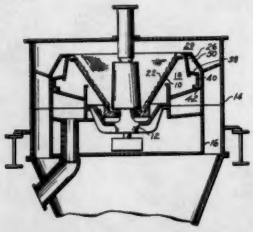


This disclosure relates to a bag constructed particularly for the packaging of products which are subject to further chemical reaction, i.e., chemical changes produced in substances by light being absorbed directly, by reflection, or by transmission, whether infrared or ultraviolet, as well as from the visible rays of the spectrum, the bag being formed as a seamless homogeneous one-piece tube flattened upon itself to define a pair of oppositely disposed flattened edge portions, the tubing constructed from synthetic generally opaque plastic material, the flattened material being folded upon itself at least once to bring the flattened edge portions into contiguous relationship and form at least a two-ply tubular member, means securing the edge portions to each other to define a tubular member having axially opposite end portions, and means closing at least one of said end portions.

3,647,135
CONTINUOUSLY OPERATING CENTRIFUGAL SEPARATOR

Andre Mercier, La Madelaine, France, assignor to Fives Lille-Cail, Paris, France

Filed Dec. 8, 1969, Ser. No. 883,281
Claims priority, application France, Dec. 9, 1968, 177147
Int. Cl. B01d *21/26;* **B04b** *3/00, 11/00*
U.S. Cl. 233—1 A **10 Claims**

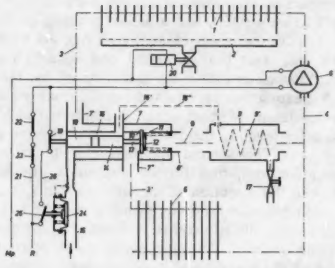


The imperforate conical basket of a centrifugal separator carries a conical, mainly imperforate skirt which depends from the upper basket rim into the liquid receptacle bounded by the basket and by a stationary partition in the separator casing. The liquid flowing upwardly between the inner basket wall and a screen enters recesses at the top of the basket at least partly bounded by the skirt and is led to the inner skirt face. It is discharged centrifugally from the free lower edge of the skirt against a conical baffle attached to the partition and downwardly bounding an isolating chamber radially confined between the outer skirt face and the partition. Contamination of the discharged liquid with simultaneously discharged solids is prevented, air cannot carry the discharged liquid into the separated solids nor vice versa.

3,647,136
FORCED-CIRCULATION HOT WATER HEATING SYSTEM

Hans Meier, Remscheid, Germany, assignor to Joh. Vaillant KG, Remscheid, Germany

Filed Aug. 7, 1970, Ser. No. 62,053
Claims priority, application Germany, Sept. 12, 1969, P 19 46 242.1
Int. Cl. F24d *3/08*
U.S. Cl. 237—8 **4 Claims**



A hot water feed trunk runs from a gas fired water heater to a priority valve with branches from the priority valve to a radiator and to a heat exchanger respectively. Return branches from the heat exchanger and from the radiator join a return water trunk leading to the water heater and having a circulating pump therein. The priority valve includes a valve closure and a temperature responsive element positioned to be primarily responsive to cold service water (proceeding to the heat exchanger) and secondarily responsive to the temperature of the water from the feed trunk. When the element is comparatively cool, the feed water is sent to the heat exchanger. When the element is relatively hot, the feed water is sent to the radiator. A first switch closed by the flowing of service water is connected in series with a second switch so that when the two are closed the circulating pump will be energized and the valve controlling the gas flow to the burner will be opened. In one embodiment the second switch is controlled by the same element as actuates the valve closure. In another embodiment a second heat responsive element subjected to the same temperature conditions as the first controls the second switch.

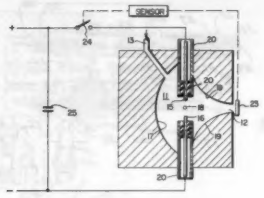
3,647,137
HYDRAULIC CHAMBER INCORPORATING A JET NOZZLE

Theodore T. Naydan, Schenectady, N.Y., assignor to Environment/One Corporation, Schenectady, N.Y.

Filed Oct. 20, 1970, Ser. No. 82,320
Int. Cl. B05b *7/30*
U.S. Cl. 239—102 **5 Claims**

A hydraulic chamber incorporating a nozzle capable of delivering a very high instantaneous pulsed dynamic jet in apparatus producing a shock wave in a relatively incompressible liquid is obtained when the effective locus of the shock

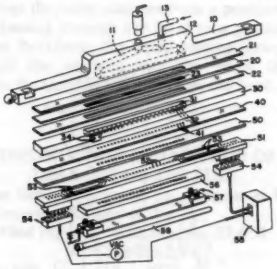
wave is such that the pressure wave generated thereby is transmitted to build up rapidly and uniformly in a direction along the centerline of the nozzle. A suitable configuration for such chamber is a parabolic cissoid in which the locus of the shock wave is effectively at the focal point of the parabolic portion of such chamber thereby converting the resultant spherical waves into additive plane waves in the direction of the centerline of the nozzle opening. The shock wave employed in the apparatus can be produced by mechanical or electrical energy, or a combination thereof.



3,647,138
COATING HEAD SUBASSEMBLY WITH CLEANOUT PORT

Philip H. Houser, Chillicothe, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed Nov. 17, 1969, Ser. No. 877,255
Int. Cl. B05b *5/08*
U.S. Cl. 239—104 **1 Claim**



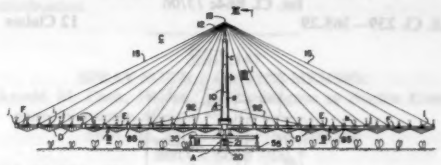
In the construction of a laminated coating head in which drops of coating material are ejected from very small orifices in an orifice plate toward a web or other article to be coated, the orifice plate, the filter plate, and an inlet plate are first assembled in what is termed a "clean package" and flushed through a port in the inlet plate with a cleaning fluid to insure that no particles large enough to clog the orifices have been trapped in the coating head during construction thereof. Compressed air may also be blown into the assembly during flushing and following flushing, the port on the inlet plate is sealed and the remaining components attached to the "clean package."

3,647,139
TOWER IRRIGATOR

Charles De Long, Jr., and Stephen D. Newell, both of Du Bois, Pa., assignors to Alco Standard Corporation, Valley Forge, Pa.

Filed May 18, 1970, Ser. No. 38,456
Int. Cl. B05b *3/00*
U.S. Cl. 239—177 **12 Claims**

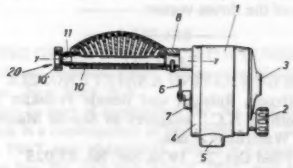
A rotating tower or turret irrigating or liquid dispensing apparatus has opposed, horizontally extending, side arm assemblies made up of a plurality of coupled-together liquid-carrying pipe or conduit members that are carried on a central column or mast and provided with sprinkling means or spray heads for rotatably covering a large ground area from a fixed central axis. Each conduit or pipe member is suspended adjacent its opposite ends by cord members that are connected to a column-mounted spread bracket, and is tension-stressed in its positioning along its length between the suspending cord members.



3,647,140
SPRINKLER CONSTRUCTION

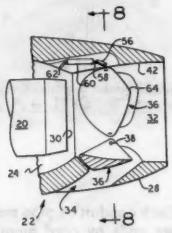
Alexander Perrot, and Emil Schucker, both of Calw, Germany, assignors to Perrot-Regnerbau GmbH & Co., Calw am Wurtt, Germany

Filed May 19, 1970, Ser. No. 38,743
Claims priority, application Germany, May 24, 1969, P 19 26 735.7
Int. Cl. B05b *3/16*
U.S. Cl. 239—242 **10 Claims**



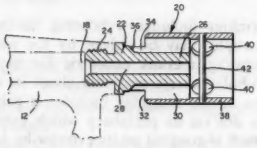
A lawn sprinkler includes a housing having a turbine which, for example, may be driven by the water supplied thereto for rotating a crank eccentric for the purpose of oscillating a tubular nozzle assembly about its own longitudinal axis. The nozzle assembly includes a guide sleeve or tube having a slot on its periphery which extends longitudinally and which is covered on its exterior by a nozzle body defining a plurality of nozzle passages oriented at divergent angles on each side of a central vertical nozzle passage. A regulating sleeve is positioned inside the guide sleeve and has a threaded connection with the guide sleeve at one end. It includes a plurality of nozzle pattern selection axes or generatrices which include one or more slots arranged in longitudinal patterns at spaced locations around the periphery. The regulating sleeve includes a knob portion extending outwardly to one side of the sprinkler which may be engaged by an operator to selectively position one of the generatrices in alignment with the longitudinal slot of the outer guide sleeve. The guide sleeve slot in turn communicates with the passages of the nozzle body. The longitudinal slot patterns which are defined along the generatrices of the regulating sleeve are advantageously spaced such that the sprinkle pattern of operation of the device may be controlled for example to provide for a full sprinkling pattern or a reduced pattern, as well as a pattern on each side or on only one side, or to provide for sprinkling only on the sides and not in a central area.

3,647,141
THRUST CONTROLLING APPARATUS
David A. Murday, Imperial Beach, Calif., assignor to Rohr Corporation, Chula Vista, Calif.
Filed June 1, 1970, Ser. No. 41,831
Int. Cl. B64c *15/06*
U.S. Cl. 239—265.29 **12 Claims**



Apparatus comprises elongate shroud surrounding jet engine. Aft portion of shroud extends rearwardly beyond stream. Passages through shroud wall aft of nozzle exit admit ambient air to define shroud aft portion as an ejector ring. A blocker door is provided for each passage and swings on lateral pivot from first forward position blocking forward portion of its passage, through intermediate positions partially blocking rearward flow of exhaust stream and redirecting portion of stream out through passages, to second full aft position where doors meet to block all rearward flow and redirect it out through passages. For supersonic flight afterburner operation, doors are bodily moved to fully block passages. Apparatus may be used with conventional jet or fan jet engines. Doors may be operated independently to modify the direction of the thrust vector.

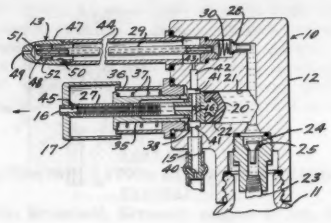
3,647,142
AIR GUN HAVING A SAFETY NOZZLE
Edward H. Drude, Raleigh, and Bennie Franklin Mangum, Garner, both of N.C., assignors to Scovill Manufacturing Company, Waterbury, Conn.
Filed Oct. 22, 1970, Ser. No. 83,025
Int. Cl. B05b *1/28*
U.S. Cl. 239—288.3 **4 Claims**



The safety nozzle on this air gun has rearwardly directed bores having oddly-shaped rearward openings to make plugging difficult. Radial holes in a forward sleeve and a diametrically disposed pin reduce dynamic pressures and noise levels.

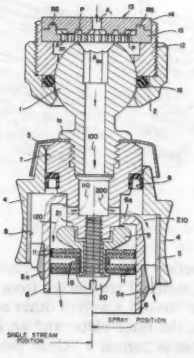
3,647,143
ATOMIZER
William D. Gauthier, Sylvania Township, and Ernest G. Lierke, Toledo, both of Ohio, assignors to Champion Spark Plug Company, Toledo, Ohio
Filed Apr. 6, 1970, Ser. No. 25,754
Int. Cl. B05b *7/30*
U.S. Cl. 239—342 **6 Claims**

Apparatus for measuring and atomizing a predetermined quantity of liquid. Compressed atomizing gas is supplied through a passage to an atomizing nozzle. A finger actuated plunger moves a piston pump for measuring and delivering the predetermined quantity of liquid from a reservoir to the nozzle. The displacement of the piston is varied to change the predetermined quantity of liquid delivered to the nozzle.



An optional gas pressure relief passage may extend from the gas passage through the plunger for reducing gas flow to the nozzle when the apparatus is not in use. When a finger is placed on the plunger to operate the pump, gas flow to the nozzle is reestablished.

3,647,144
SWIVEL SPRAY APPARATUS
Richard Grant Parkison, and James Richard Griffin, both of Louisville, Ky., assignors to American Standard Inc., New York, N.Y.
Filed Mar. 31, 1970, Ser. No. 24,260
Int. Cl. B05b *1/32*
U.S. Cl. 239—456 **13 Claims**



A swivel type of apparatus, suitable as a plumbing fitting, for providing a single stream or a spray stream. The apparatus includes a ball type of swivel employing an O-ring positioned along the axis of the ball structure so as to seal the swivel arrangement against leakage. The apparatus also includes a hand-controlled slider component which may be moved either to a position so as to render the apparatus capable of supplying the single stream, or to another position so as to provide the spray stream.

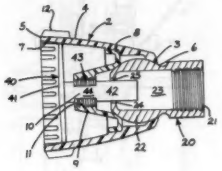
The apparatus also includes a flow controller in the form of a pair of disks for rendering the two types of streams developed by the apparatus substantially free of the effect of varying pressures of the liquid supplied to the apparatus. The disks include (1) a rigid disk having a plurality of small apertures which are parallel to each other and (2) a flexible disk mounted closely adjacent to the rigid disk, the flexible disk having a smaller number of apertures of larger diameter. The flexible disk also includes a plurality of flexible projections

which normally are barely in contact with the rigid disk and which become compressed to reduce the "open" area of fluid transmission as the pressure of the fluid rises above a predetermined value so as to render the exit stream substantially independent of the pressure variations.

3,647,145
SHOWER HEAD

Merritt J. Nelson, 13121 Paine, Sparta, Mich.

Filed June 17, 1970, Ser. No. 46,960
Int. Cl. B05b *1/32*
U.S. Cl. 239—460 5 Claims

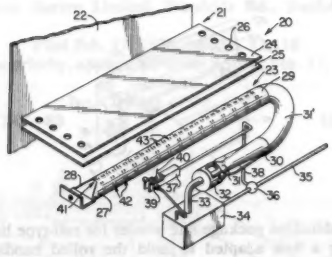


An adjustable shower head assembly including a generally cup-shaped hollow shower head having an opening in its bottom for passing liquid therethrough, a ball joint communicating with a liquid source and communicating with the opening in the head, a valve element movably associated with the head, the valve element including a seat and a stem with a liquid passageway therethrough, the valve element operably associated with the opening in the head whereby rotation of the head moves the valve element from a position restricting liquid from passing through the head to a position allowing liquid to pass therefrom, the liquid passing through the ball joint, through the opening into the head, through the passageway in the stem and thence from the head.

3,647,146
BURNER CONSTRUCTION AND METHOD OF MAKING THE SAME OR THE LIKE

Francis Simon Genbauffe, Irwin, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

Filed May 15, 1970, Ser. No. 37,654
Int. Cl. B05b *1/14*
U.S. Cl. 239—559 5 Claims

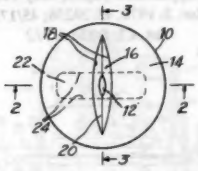


A burner construction having wall means defining a chamber for receiving fuel from a source thereof, the wall means having a plurality of port means passing therethrough and interconnecting the exterior of the wall means with the chamber whereby fuel will issue from the chamber out through the port means. The port means are arranged in a pattern through the wall means to define a first row of aligned spaced port means and a plurality of second rows of aligned spaced port means transverse and adjacent to the first row in spaced parallel relation to each other with the spacing between adjacent second rows being greater than the spacing between adjacent port means in the first row so that secondary air will be provided in a sufficient amount for all of the port means of the burner construction for proper fuel combustion.

3,647,147
SPRAY NOZZLE ORIFICE MEMBER

Arnold M. Cook, Holden, Mass., assignor to Norton Company, Worcester, Mass.

Filed Dec. 23, 1970, Ser. No. 100,886
Int. Cl. B05b *1/00*
U.S. Cl. 239—599 4 Claims

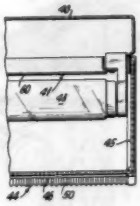


A spray nozzle orifice member which produces a flat fan-shaped spray making it ideally suited for the application of coatings. The orifice is formed by the intersection of a straight bottomed slot on one side and a curved bottom V-shaped groove on the opposite side of said member. The improvement resides in the ease and economy of fabrication of such a spray nozzle member as a function of the groove-slot combination concept.

3,647,148
VEILING GLARE CONTROL WITH LUMINAIRES

Vearl S. Wince, Newark, Ohio, assignor to Holophane Company, Inc., New York, N.Y.

Continuation-in-part of application Ser. No. 788,669, Oct. 22, 1968, which is a continuation of application Ser. No. 664,890, Aug. 31, 1967, now abandoned, which is a continuation of application Ser. No. 453,709, May 6, 1965, now abandoned, which is a continuation-in-part of application Ser. No. 249,747, Jun. 7, 1963, now abandoned. This application Dec. 11, 1969, Ser. No. 884,280
Int. Cl. F21v *13/04*
U.S. Cl. 240—93 16 Claims



A lighting system for eliminating specular reflection from work areas from impinging upon the eyes of persons in a workroom, such as a classroom and including a luminaire having a light source and a reflector having prisms which act to redirect longitudinal and transverse direct light from the source into lateral angles eliminating both longitudinal and transverse components of downlight on either side of a longitudinal plane through the light source. A work area receiving beams of longitudinal and transverse light at only lateral angles will not reflect light in the longitudinal directions at

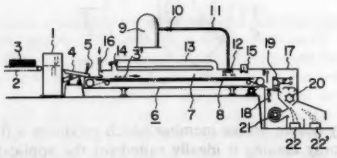
angles of "veiling glare." The refractor also provides sides having prisms redirecting light in the beam direction and upwardly to illuminate portions of the ceiling. Finally, a reflector is included which includes portions facing away from a light source so as to reflect as little light as possible upon the refractor.

3,647,149

APPARATUS FOR THE SEPARATION OF WIRE AND ITS INSULATING MATERIAL AND RECOVERING THESE AS RAW MATERIALS

Shichiro Morita; Hiroshi Shimazu; Tsutomu Saito; Hiroshi Nakamura, and Torata Maeda, all of Sasebo, Japan, assignors to Sasebo Heavy Industries Co., Ltd., Tokyo, Japan

Filed Apr. 20, 1970, Ser. No. 29,868
Claims priority, application Japan, May 12, 1969, 44/35791; Mar. 3, 1970, 45/20256; 45/17651
Int. Cl. B02c *19/12*
U.S. Cl. 241—65 4 Claims



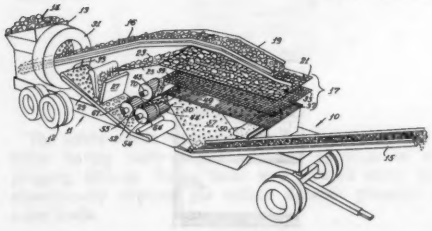
Wire bundles are cut and fed along an elongated rapid cooling unit while being sprayed with a low-temperature gas. From the cooling unit, the wire passes to a separating device having a levelling unit, a feeder and hammering arrangement striking the now brittle wire. The material is then fed to an impeller, moves across slanting plates to effect gravity separation of the insulation material from the wire. Conveyor means on the impeller output side collect and carry away the separated wire and insulating material.

3,647,150

CRUSHER

Roy W. Stephanek, Cedar Rapids, Iowa, assignor to Pettibone Corporation, Chicago, Ill.

Filed Aug. 27, 1969, Ser. No. 853,401
Int. Cl. B02c *4/32*; B07b *1/28*
U.S. Cl. 241—75 7 Claims



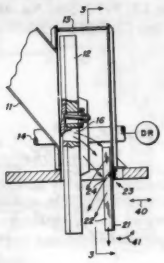
Portable crusher system achieving high crushing efficiency with structural simplicity. In a preferred embodiment two side-by-side crushing bites or passes are operated using two adjacent rollers on a first shaft and two separate opposing rollers on their respective second and third shafts, all supported by the same frame. The bite spacings are individually adjustable. The entire crushed stream leaving each bite is screened, and material which is product-sized and smaller is removed therefrom before any of the crushed material is fed into another crushing cycle. Each bite receives only the sizes appropriate for its bite spacing.

3,647,151

ANGLE FEED CHIPPER WITH CARD BREAKER

Adrian Artiano, and Robert M. Brown, both of Everett, Wash., assignors to The Black Clawson Company, Hamilton, Ohio

Filed Sept. 29, 1969, Ser. No. 861,786
Int. Cl. B27l *11/02*
U.S. Cl. 241—92 10 Claims



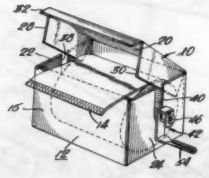
A disk chipper in which a log or other large piece of wood is fed to a rotating disk having a series of radially oriented slots extending through it and a chipper blade positioned adjacent each of the slots. In order to break up cards which pass through the slots into chips without unduly breaking up chips which are already of an acceptable size, and thereby produce fines, a series of flat bars are mounted behind the working face of the disk spaced apart a distance equal to three to six times the width of an acceptable chip, so that as the cards pass through the slots in the disk, they strike the bars and are broken up into chips of an acceptable size. The base member to which the bars are attached may be adjustably mounted on the chipper so that the position of the bars can be adjusted for optimum performance.

3,647,152

COMBINED PACKAGE AND WINDER FOR ROLL-TYPE BANDAGES

Robert J. Trewella, Reading, Pa., assignor to Wyomissing Corporation, Reading, Pa.

Filed May 7, 1970, Ser. No. 35,337
Int. Cl. B65h *75/02*
U.S. Cl. 242—60 8 Claims



A combination package and winder for roll-type bandages including a box adapted to hold the rolled bandage and winder. Opposed slots in the end panels of the box are adapted to support a demountable bandage winding crank assembly which is retained in the slots when the box is closed by end flaps downwardly extending from the top panel. The package is utilized as a winder by attaching an end of an unrolled bandage to the crank spindle, inserting the spindle in the end panel slots, closing the top to retain the spindle in position by means of the top panel end flaps, and turning the crank to reel in the bandage while applying light pressure to the box top to smooth out and establish a light tensioning of the bandage as it is wound. The crank assembly in a

preferred embodiment may be disassembled to fit within the box for storage.

3,647,153

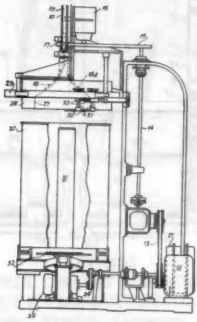
WINDING OF CONTINUOUS STRANDS

Richard Westwell Schofield, Prestwich, England, assignor to General Engineering Company (Radcliffe) Limited

Continuation-in-part of application Ser. No. 748,347, July 29, 1968, now abandoned. This application Oct. 21, 1969, Ser. No. 871,996

Int. Cl. B21c 47/14

U.S. Cl. 242—82 **15 Claims**



An apparatus for producing, by a continuous winding process, a rosette coil within a container, including a capstan device for drawing the wire continuously from a supply and feeding it to a rotary tubular flyer which depends from a position below the capstan and is downwardly, outwardly and rearwardly formed in its end region so as to eject wire to be coiled from its end in such a manner that it has a component of movement rearwardly relative to the direction of rotation of the flyer and downwardly to form convolutions arranged to fall into a container; the flyer terminating at a radial distance from the axis of rotation of the flyer smaller than the mean radius of the coil to be formed. In order to assist feeding of the wire through the flyer fluid flow means may be employed.

3,647,154

WIRE-HANDLING APPARATUS

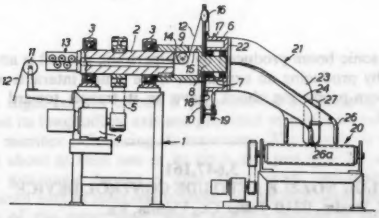
John W. Pamplin, Eastleigh, England, assignor to Marshall Richards Barcro Limited, Woodside Rd., Eastleigh, England

Filed Feb. 17, 1970, Ser. No. 12,118

Claims priority, application Great Britain, Feb. 17, 1969, 8,530/69

Int. Cl. B21c 47/02, 47/14

U.S. Cl. 242—83 **16 Claims**



Dead block wire-coiling apparatus in which the rotor device for coiling the wire about the block is mounted at the upstream side of the block and an elongate carrier for the coiled wire is secured to the downstream side of the block to lead the coiled wire away, and including means for preventing rotation of the block from rotating in the form of interengaging holding means, e.g., a pair of rollers, one mounted on the carrier and the other mounted from a fixed structure and so arranged that the coiled wire passes between the holding means during operation, the latter being driven at a speed similar to the speed of the wire so as not to obstruct its movement.

3,647,155

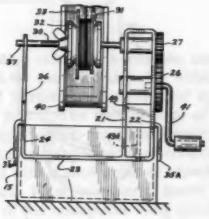
WINDING DEVICE FOR FISHLINE

Julian B. Jorgenson, 3538 Rainbow Drive, Minnetonka, Minn.

Filed July 22, 1969, Ser. No. 843,715

Int. Cl. B65h 75/00, 75/38

U.S. Cl. 242—106 **8 Claims**



A winding device for transferring fishing line from storage spools to a spool for a fishing reel which may use a storage case for the line and winder as a base member for mounting the line spool and the reel spool in proper position so that as winding takes place the line will not twist.

3,647,156

SLEEVE FOR REELING UP AND/OR WET-TREATING YARN OR THREAD

Walter Henning, Hoengen near Aachen, Germany, assignor to Messrs. Jos. Zimmermann, Aachen, Germany

Filed Nov. 20, 1969, Ser. No. 878,416

Claims priority, application Germany, Nov. 25, 1968, P 18 10 774.9

Int. Cl. B65h 75/20, 75/10

U.S. Cl. 242—118.1 **8 Claims**

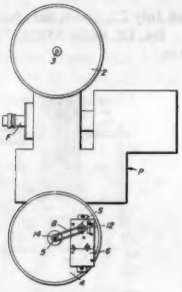
A textile sleeve for reeling up and for wet-treating thread or yarn, the sleeve being cylindrical or conical and having end rings and spaced intermediate rings, with a row of connecting webs between the rings of each pair of adjacent rings. The webs of each row are inclined to the axial direction of the sleeve and always at least two webs of each row are inclined in regular sequence in opposite sense.

3,647,157

MOTION PICTURE PROJECTOR EXCESS ROTATIONAL SPEED DETECTOR

Michael W. Chitty, New York, N.Y., assignor to Century Projector Corporation, New York, N.Y.

Filed May 13, 1970, Ser. No. 36,868
Int. Cl. B65h *59/38*; G03b *1/02*; G11b *15/13*
U.S. Cl. 242—191 9 Claims



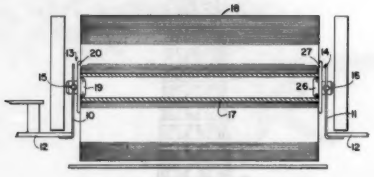
The invention is an electronic system which senses the rotational speed of the takeup reel of a motion picture projector during operation. If the speed is higher than normal due to breakage, absence of or end of film, the device operates to shut down the projector and/or provide an audible or visible warning.

3,647,158

PAPER ROLL SUPPORT AND TENSION DEVICE

Alvin Feder, Skokie, Ill., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Jan. 22, 1970, Ser. No. 5,048
Int. Cl. B65h *19/00*
U.S. Cl. 242—55.2 6 Claims



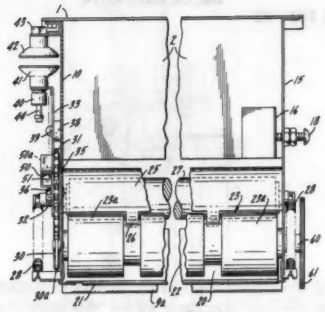
A paper roll support and tension device for a printer having resilient support brackets mounted to the printer frame or chassis. Trunnions pivotally attached to the support brackets allowing easy insertion and removal of the paper roll. Discs formed on the pivotally attached trunnions provide uniform tension on the sides of the paper roll, retarding rotation of the paper roll and causing the paper to be uniformly fed to the printing mechanism.

3,647,159

TOWEL DISPENSER

Edward L. Bump, Oak Park, Ill., assignor to Vaughan Mfg. Co., Chicago, Ill.

Filed June 18, 1970, Ser. No. 47,233
Int. Cl. B65h *19/00*
U.S. Cl. 242—55.53 7 Claims



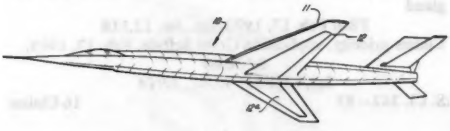
A towel dispenser having automatic towel length controlling means and roll support tensioning means.

3,647,160

METHOD AND APPARATUS FOR REDUCING SONIC BOOMS

Morton Alperin, 6000 Lockhurst Drive, Woodland Hills, Calif.

Continuation-in-part of application Ser. No. 741,162, June 28, 1968, now abandoned. This application Sept. 23, 1968, Ser. No. 761,592
Int. Cl. B64c *23/04*
U.S. Cl. 244—1 N 8 Claims



The sonic boom produced by a supersonic aircraft is attenuated by producing an expansion wave which interacts with the boom-producing shock wave as it travels toward the ground.

3,647,161

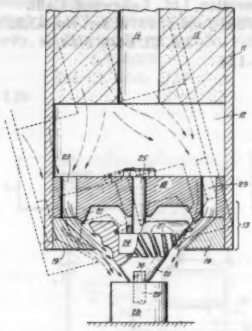
PLUG NOZZLE ATTITUDE CONTROL DEVICE

John E. Draim, 9310 Telfer Ct., Vienna, Va.

Filed July 18, 1969, Ser. No. 842,940
Int. Cl. F41g *7/12*; F42b *19/08*; F02k *1/08*
U.S. Cl. 244—3.2 8 Claims

The disclosure relates to the use of a spinning plug nozzle to provide an attitude reference means of which flow of fluid

may be controlled to provide a righting moment in rockets

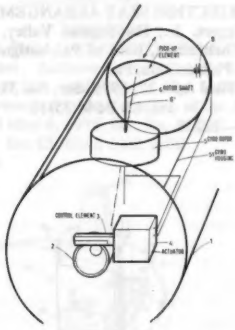


and marine vehicles.

3,647,162
FLIGHT CONTROL CIRCUIT FOR MISSILE SPINNING ABOUT ITS LONGITUDINAL AXIS

Heinz-Dieter Muller, Munich, Germany, assignor to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung, Munich, Germany

Filed Aug. 19, 1969, Ser. No. 851,401
Claims priority, application Germany, Aug. 23, 1968, P 17 81 098.9
Int. Cl. F41g *7/00*; F42b *15/02*; G06f *15/50*
U.S. Cl. 244—3.2 8 Claims

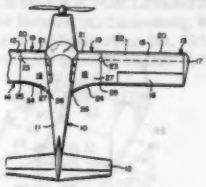


A flight control circuit is provided for a missile spinning about its longitudinal axis and provided with at least one control member influencing its trajectory. The missile is stabilized about at least one of its pitch and yaw axes by at least one gyroscope having a gyro rotor shaft operatively associated with at least one position pickup indicating the position of the rotor shaft. Each position pickup is mounted rigidly on the missile frame in a plane containing the longitudinal axis of the missile and which plane also included the line of action of the control member. Each position pickup is connected directly to actuating means for the control member.

3,647,163
FOLDABLE SEMIRIGID AIRFOIL FOR AIRBORNE VEHICLES

Thomas E. Sweeney, 61 Overbrook Drive, Princeton, N.J.

Filed Nov. 19, 1969, Ser. No. 877,945
Int. Cl. B64c *3/56*
U.S. Cl. 244—49 10 Claims

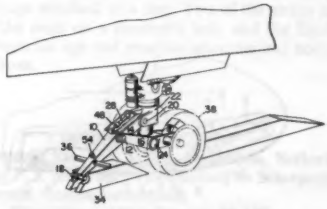


The present invention relates to a foldable, composite rigid and semirigid airfoil for use with airborne vehicles. The airfoil includes a rigid portion. A hinged rigid spar defines a leading edge of the airfoil. The trailing edge of the airfoil is defined by both a rigid aileron structure forming part of the rigid wing portion, and a cable which interconnects the rigid portion of the airfoil with a root point of attachment on the fuselage of the vehicle. Flexible material forms top and bottom airfoil surfaces of the collapsible wing portion when the airfoil is deployed, said airfoil surfaces being continuous with the aerodynamic form of the rigid wing portion.

3,647,164
LAUNCH BAR INSTALLATION

Harold R. Smith, Encino, Calif., assignor to The United States of America as represented by the Secretary of the Navy

Filed Aug. 19, 1970, Ser. No. 65,162
Int. Cl. B64f *1/04*
U.S. Cl. 244—63 5 Claims



An aircraft nosewheel landing gear structure incorporating an oleo strut supported launch bar mechanism capable of movement when airborne to a wheel-contacting (braking) position prior to retraction of the nosewheel into the aircraft wheel well.

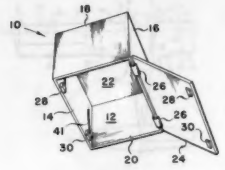
3,647,165
AIRCRAFT COMPARTMENT AND MAGNETIC CONNECTING ASSEMBLY

James Whitla, Tujunga, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.

Filed Apr. 27, 1970, Ser. No. 32,042
Int. Cl. B64d *13/00*
U.S. Cl. 244—118 P 1 Claim

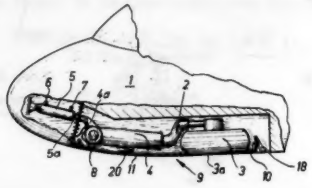
A magnetic connector assembly combined with an oxygen-mask carrying compartment mounted overhead of an aircraft cabin passenger's seat for automatic release of oxygen-mask equipment from the compartment to a passenger upon emergency or depressurization of the cabin. An electromagnet

carrying spaced poles is securely mounted interiorly of the compartment by means of an adjustable bracket abutting a first wall's edge associated with and opposing the closing edge of the compartment's door. A permanent magnet is securely mounted on the inner side of the door adjacent its closing edge and is cooperatively disposed in relation to said poles. Energization of the core of the electromagnet repels the magnet from the cooperating spaced poles, thereby



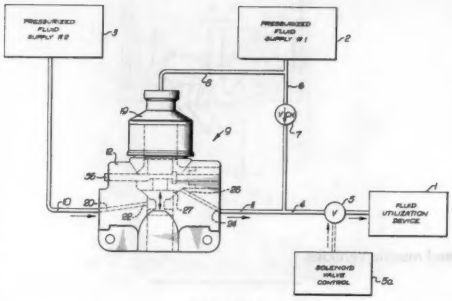
swinging open in a downward fashion the door upon hinging supports for dropping of the oxygen-mask into the lap of a passenger. The particular arrangement and orientation of the magnetic connector assembly in the aircraft concentrates and restricts its magnetic flux to at least one vertical plane normal to a horizontal plane in which the aircraft is travelling, thus eliminating interference with normal horizontal deviations of the aircraft's navigational compass.

3,647,166
COVER ARRANGEMENT
Franz Riedl, Munich, Germany, assignor to Vereinigte Flugtechnische Werke GmbH fruher "Weser" Flugzeugbau am Focke-Wulf am Heinkel-Flugzeugbau, Bremen, Germany
Filed Jan. 19, 1970, Ser. No. 3,898
Claims priority, application Germany, Jan. 24, 1969, P 19 03 575.7
Int. Cl. B64c *25/16*
U.S. Cl. 244—102 A **8 Claims**



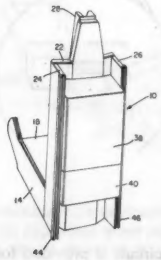
A cover arrangement for closing at least part of the opening of a wheel well for a retractible landing gear of an aircraft. The cover arrangement has one or more units, each incorporating a cover plate a[illegible] an engaging arm which extends generally at right angles to the plane of the cover plate. The unit is pivotably mounted at the edge of the opening for movement between open and closed positions. In the closed position, the arm extends into the wheel well and the cover plate closes at least part of the opening of the wheel well and is in the path of travel of the landing gear when the latter is lowered, and in the open position the cover plate is outside of the opening and the arm is in the path of travel of the landing gear when the latter is retracted. Consequently, the unit is pivoted into its open position by the landing gear when the same is lowered, and is pivoted into its closed position by the landing gear when the same is retracted. Spring means are provided which hold the unit in open position when the landing gear is in its lowered position and in closed position when the landing gear is in its retracted position.

3,647,167
FLUID DELIVERY SYSTEM FOR AIRCRAFT WINDSHIELDS
Teddy M. Schiller, Huntington Beach, Calif., assignor to Purex Corporation, Ltd., Lakewood, Calif.
Filed June 5, 1970, Ser. No. 43,859
Int. Cl. B64c *1/14*
U.S. Cl. 244—121 **8 Claims**



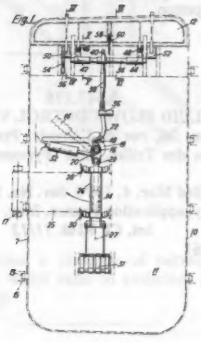
A fluid delivery system useful for delivery of rain repellent fluid to aircraft windshields including first and second tanks of fluid under pressure, a valve to control first tank delivery to a discharge line and adapted to close when discharge line pressure is greater than the first tank pressure and means responsive to first and second tank pressure, e.g., to a predetermined ratio of such tank pressures to control second tank discharge to the line.

3,647,168
EJECTION SEAT ARRANGEMENT
Walter S. Eggert, Jr., Huntingdon Valley, and Michael S. Frankel, Cheltenham, both of Pa., assignors to The Budd Company, Philadelphia, Pa.
Filed Apr. 27, 1970, Ser. No. 31,898
Int. Cl. B64d *25/10*
U.S. Cl. 244—122 A **6 Claims**



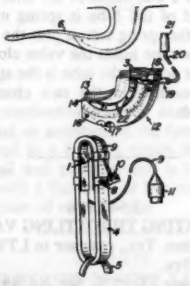
A lightweight ejection seat includes a main body having a honeycomb core sandwiched between two formed sheets of metal. A track and rail arrangement is used to control the direction of seat ejection. Means are provided to permit the seat to tilt prior to the separation of the seat from the vehicle.

3,647,169
AIRCRAFT DOORS
Eric Sydney Allwright, Leatherhead, and Roy Charles Godwin, Ringwood, both of England, assignors to British Aircraft Corporation Limited
Filed Jan. 27, 1970, Ser. No. 6,091
Claims priority, application Great Britain, Feb. 7, 1969, 6,830/69
Int. Cl. B64c *1/14*
U.S. Cl. 244—129 10 Claims



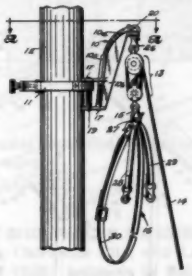
An aircraft door having a main part which is outwardly hinged from the fuselage and which vertically lowers into a closed position in secure engagement therewith. A locking panel lies above the upper horizontal edge of the main door and is connected therewith by operating linkage. When the main door is being lowered into a closed position the panel is carried upwardly and outwardly to fill the space between the upper edge of the main door and the fuselage opening, thereby positively locking the door in a closed position.

3,647,170
HELICOPTER SLING LOAD ELECTRICAL CONNECTOR
Charles W. Beeker, Baltimore, and Royale R. Crabtree, Towson, both of Md., assignors to The United States of America as represented by the Secretary of the Army
Filed May 4, 1970, Ser. No. 34,291
Int. Cl. B64d *1/00, 9/00*
U.S. Cl. 244—136 8 Claims



A means and method for electrically connecting the electrical system of a load means to the electrical power supply of a lifting means. The disclosed embodiment uses a removable pair of insulating members having contacts which, when affixed to the cargo hook of a helicopter, form bus bar means along the sides of said hook. A sling body member comprising nylon straps has contact means fastened at spaced points so as to contact the bus bars when a load is suspended from the hook by the sling, thus providing electrical continuity between circuitry in the helicopter and the load.

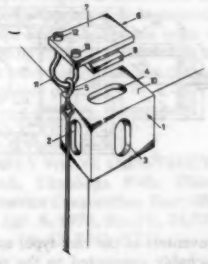
3,647,171
RESCUE DEVICE FOR LINEMEN
John E. Rafferty, 100 Holman St., Lunenburg, Mass.
Continuation-in-part of application Ser. No. 735,014, June 6, 1968, now abandoned. This application Dec. 1, 1969, Ser. No. 881,166
Int. Cl. F16m *13/00*
U.S. Cl. 248—221 5 Claims



A device for lowering a disabled lineman from an electric pole. A portable hoist has a saddle with upper and lower flanges curved to engage the pole. A pair of spaced bars and a post portion rigidly interconnect the flanges. Adjustable strap means connected to the spaced bars secure the hoist to the pole. The post portion is adapted to carry a block and tackle with a rope leading to the ground. The hoist can be carried up by a lineman and attached to the pole at any desired height.

A rescue harness is attached to the block and tackle, and has three straps attached to a ring. Two of the straps can be hooked to the rings on a lineman's belt, and the third step passed between his legs and over one shoulder and hooked to the ring in front.

3,647,172
CONTAINER LASHING
Leonard Hendrik Van Der Molen, Rotterdam, Netherlands, assignor to P. J. Enderburg's Zeilmakerij en Scheepstuigerij N.V., Veerstal, Gouda, Netherlands
Filed May 6, 1970, Ser. No. 35,128
Claims priority, application Netherlands, May 7, 1969, 6906974
Int. Cl. B65d *1/22*
U.S. Cl. 248—361 R 1 Claim



A fitting for lashing containers, which comprises: a top plate, a centering portion and a locking part fixedly secured

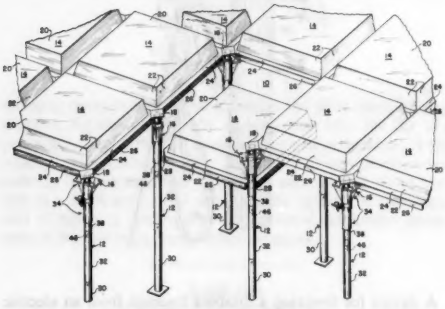
to each other, which fitting will be prevented from tilting in the event of a lashing force directed via the top plate substantially to the outer surface of the corner-fitting of a container, even if this force deviates considerably from the vertical.

3,647,173

CONCRETE CEILING SLAB FORM INSTALLATION AND DOME-SUPPORTING SHORE ASSEMBLY THEREFOR

Dennis R. Pipala, Park Ridge, Ill., assignor to Symons Corporation, Des Plaines, Ill.

Filed Jan. 15, 1970, Ser. No. 3,061
Int. Cl. E04g *11/40*
U.S. Cl. 249—31 **5 Claims**



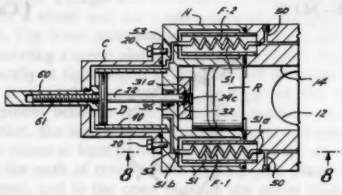
A supporting shore for a concrete ceiling slab, having a vertically and downwardly shiftable rotatable member which normally supports the adjacent truncated four corners of a quadrilaterally arranged group of four inverted generally rectangular pan-shaped slab-supporting domes and which, in the lowered and rotated position of the member, moves out of operative register with two of the four corners so as to release the other two corners for dome-removal purposes, while at the same time the shore continues to support the concrete ceiling slab until the latter has become fully hardened.

3,647,174

BLOWOUT PREVENTER

Robert K. LeRouax, Harris County, Tex., assignor to Hydril Company

Filed Sept. 25, 1970, Ser. No. 75,360
Int. Cl. E21b *29/00*; F16k *3/02*
U.S. Cl. 251—1 **20 Claims**



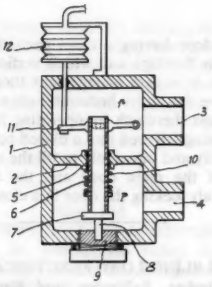
Blowout preventers of the ram-type, each having a bonnet which is detachably connected to the preventer body, and which bonnet is movable away from the preventer body to expose the ram therewith for permitting removal of the ram from the preventer for replacement or repair, wherein the ram piston and cylinder which are operable for moving the ram to and from its open and closed positions when the bonnet is secured to the preventer body are also operable for moving the bonnet away from and towards the preventer body when the bonnet is disconnected from the body. Detent means are provided for resisting relative movement between the ram and the body when the ram is in the open position and the bonnet is disconnected from the body, whereby the bonnet can be moved away from the body to the exposed ram position and then returned to reengage the bonnet with the body. Flexible hydraulic fluid conductor means is provided for operating the piston and for moving the cylinder relative to the piston.

3,647,175

FLUID FLOW CONTROL VALVE

Andre Bonneau, 26, rue de l'Avenir, Perpignan, and Henri Bontems, rue des Trilles, Elne (Pyrenees Orientales), both of France

Filed Mar. 4, 1970, Ser. No. 16,322
Claims priority, application France, Mar. 18, 1969, 6907717
Int. Cl. F16k *31/12*
U.S. Cl. 251—61 **3 Claims**



A fluid flow control valve comprises a cylindrical tube slidably mounted in a wall between the inlet and outlet valve chambers. One end of the tube is spring urged against the valve seat, so that the spring action plus the pressure against the other end of the tube holds the valve closed. In the open valve position, what acts on the tube is the spring and the difference of the pressures in the two chambers that bear against the tube ends.

3,647,176

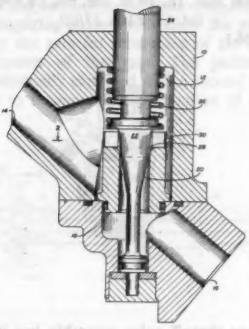
CAVITATING THROTTLING VALVE

Joe D. Usry, Arlington, Tex., assignor to LTV Electrosystems, Inc., Greenville, Tex.

Filed June 23, 1970, Ser. No. 49,048
Int. Cl. F16k *47/00*
U.S. Cl. 251—122 **6 Claims**

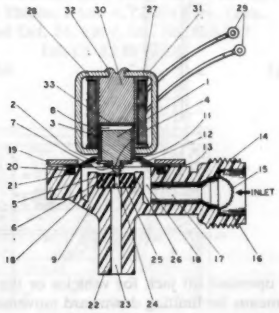
To provide a definable and repeatable transition between noncavitating and cavitating flow in a variable area venturi valve, a flow straightener is included upstream of a valve seat and metering plug assembly. Cavitating venturi valves meter the flow of fluid therethrough between the metering plug and

the valve seat. The metering plug and the valve seat have a geometry that in cross section resembles a venturi. The valve



straightener resembles a plurality of parallel passageways having a length to width ratio to collimate a flow of fluid passing therethrough.

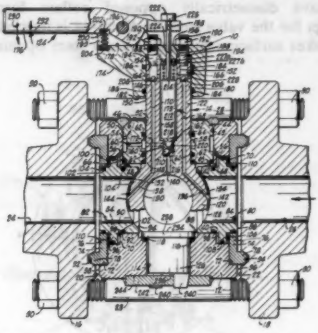
3,647,177
ALTERNATING CURRENT SOLENOIDS
Gregor L. Lang, 295 East St., Suffield, Conn.
Filed June 4, 1969, Ser. No. 830,342
Int. Cl. F16k *31/06*; H01f *7/13*
U.S. Cl. 251—129 **9 Claims**



A solenoid construction for use as a flow control valve having a coil, and an armature in the form of a valve plunger which is disposed in a housing which forms a fluid barrier between the coil and plunger, and is formed of magnetic material to provide a flux path of low reluctance linking the coil with the immersed valve plunger.

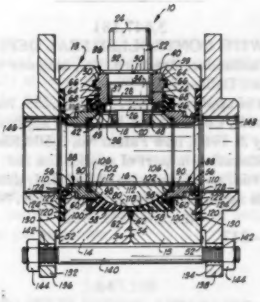
3,647,178
HIGH-PRESSURE LOW-TORQUE VALVE ASSEMBLY
Ladd M. Adams, Norman, Okla., assignor to Balon Corporation, Oklahoma City, Okla.
Filed Sept. 24, 1970, Ser. No. 74,956
Int. Cl. F16k *1/16*
U.S. Cl. 251—148 **31 Claims**

A valve assembly of the type wherein the valve seats are moved away from the valve member by fluid pressure, particularly when the valve is being opened, wherein the fluid



pressure so employed is controlled by the handle of the valve operating a control valve.

3,647,179
SPLIT BODY VALVE ASSEMBLY
Domer Scaramucci, Oklahoma City, and Ladd M. Adams, Norman, both of Okla., assignors to Balon Corporation, Oklahoma City, Okla.
Filed Oct. 6, 1969, Ser. No. 863,863
Int. Cl. F16k *3/02*
U.S. Cl. 251—172 **26 Claims**

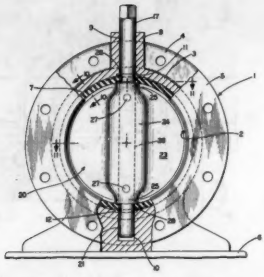


A valve assembly, having two separate body components which are sized and adapted to form the valve body in such a manner that the vertical and horizontal orientation of the two body components with respect to each other and with respect to the valve member and valve stem is assured. The valve assembly also includes axially insertable seats and/or a composite seat, each being sized and adapted to assure the sealing integrity of the valve assembly when the valve member is in the open or the closed position.

3,647,180
BUTTERFLY VALVE CONSTRUCTION
Herman S. Church, Cuyahoga Falls, Ohio, assignor to Teledyne-Mid America Corporation, Hartville, Ohio
Filed Apr. 6, 1970, Ser. No. 25,959
Int. Cl. F16k *1/226*
U.S. Cl. 251—306 **3 Claims**

A rubber gasket construction for butterfly valves which control the flow of fluids in pipelines and the like. The gasket is a precision-molded rubber component bonded in a com-

plementary or shouldered cavity formed in a valve body. The gasket has shoulders on an external annular rib seated in shoulders or a complementary groove in the valve body, and may have diametrically opposed collars forming stem openings for the valve stem. A flat area is formed on the inside gasket surface surrounding each stem opening. The inside diameter of the gasket is smaller than the outer diameter of the valve disc which rotates within the valve body and gasket, and the valve may be a typical flanged-end valve.



The precision-molded gasket is molded and vulcanized separately. Then it is bonded, with a bonding adhesive under pressure and at elevated temperature, in a generally complementary cavity formed in the valve body.

3,647,181

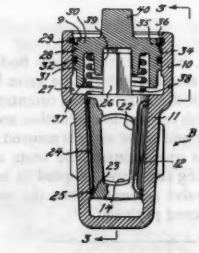
VALVE WITH CONTROLLED SEAL DEFLECTION

William L. Hulslander, Bradford, Pa., assignor to Dresser Industries, Inc., Dallas, Tex.

Continuation of application Ser. No. 682,255, Nov. 13, 1967, now abandoned , Continuation-in-part of application Ser. No. 650,953, July 3, 1967, now Patent No. 3,504,886, dated Apr. 7, 1970, Continuation-in-part of application Ser. No. 440,101, Mar. 16, 1965, now Patent No. 3,360,231, dated Dec. 26, 1967. This application Mar. 25, 1970, Ser. No. 20,471

Int. Cl. F16k *5/00*

U.S. Cl. 251—317 **14 Claims**



An elastomeric seal for a closure element in a fluid shutoff valve to seal the valve against leakage when in shutoff position. The seal is situated front and rear on the closure element and is constructed to have greater rear deflection then front to minimize shearing or scarifying thereof when encroached by the surface edge at which it is to be compressed into sealing relation.

3,647,182

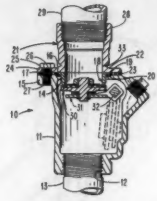
SHUTOFF VALVE ASSEMBLY

W. Donald Boudot, and Robert C. Carl, both of Cincinnati, Ohio, assignors to Dover Corporation, Cincinnati, Ohio

Filed Mar. 16, 1970, Ser. No. 19,936

Int. Cl. F16k *27/00*

U.S. Cl. 251—361 **6 Claims**



An emergency shutoff valve assembly has its valve seat supported by its casing so as to be easily replaceable in the field.

3,647,183

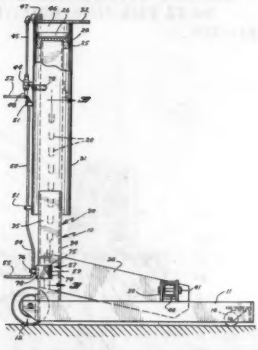
VEHICLE JACK

Sigurd A. Rishovd, Minneapolis, Minn., assignor to Royal Industries, Inc., Osseo, Minn.

Filed Sept. 2, 1970, Ser. No. 68,809

Int. Cl. B60p *1/00*

U.S. Cl. 254—2 B **5 Claims**



A fluid operated lift jack for vehicles or the like having a first stop means for limiting downward movement of the jack cylinder and a second stop means for limiting upward movement of the cylinder, said stop means yieldably retained in operative position, a single control for selectively admitting or withdrawing fluid from the jack to raise or lower the cylinder, and said control having connection with said stop means to make the second stop means inoperative during raising and the first stop means inoperative during lowering of the cylinder.

3,647,184

APPARATUS FOR TENSIONING TENDONS

William L. Vanderhurst, 20630 Carmel Road, Saratoga, Calif., and Sidney D. Kemp, 339 Vassar Ave., Berkeley, Calif.

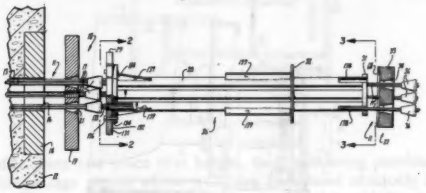
Filed Nov. 25, 1969, Ser. No. 879,780

Int. Cl. E21b *19/00*; B21d *39/00*; E04c *3/20*

U.S. Cl. 254—29 A **8 Claims**

Apparatus including a jacking device and a tendon aligning cartridge for use therewith, and a method of tensioning a plu-

rality of side-by-side tendons is disclosed. The jacking device is preferably formed as a ring-type or center hole ram having a central passageway formed of sufficient dimension to accept and receive a tendon gripping pulling head, as mounted on the ends of the tendons to be tensioned, and formed with pulling head engaging gates which allow the pulling head to be engaged by the ram for tensioning of the tendons upon axial advancement of the ram. The jacking device is preferably additionally provided with a second ring-type ram which is used to insure uniform actuation of an anchorage



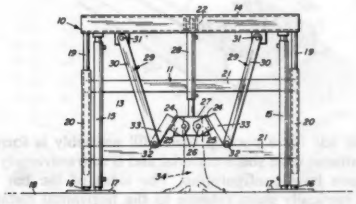
having tendon gripping wedges therein after advancement of the tensioning ram to the desired position. A cartridgelike apparatus is also preferably used with the ram in order to align and separate the tendons between the tendon anchorage and the pulling head. The cartridge may also function to assist in properly actuating the tendon anchorage into gripping engagement of the tendons. The method includes the mounting of a pulling head onto the plurality of tendons, and preferably a tendon aligning cartridge, prior to bringing the ram into position for engagement of the pulling head and tensioning of the tendons.

3,647,185

POWER-OPERATED PULLING IMPLEMENT

William Wayne Phibbs, Route 4, Lenoir City, Tenn.

Filed Oct. 24, 1969, Ser. No. 869,207
Int. Cl. E21b *19/00*
U.S. Cl. 254—30 **12 Claims**



A pulling implement includes a pair of opposed pivotally connected gripping jaws with toggle linkages arranged to exert force to close the jaws on an object to be pulled when the supporting framework is raised and thus pull the object thus gripped.

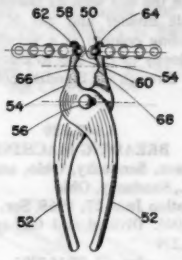
3,647,186

TOOL FOR TENSIONING AND HOLDING ROLLER CHAINS

Wallace H. Hartman, 1444 South End Parkway, Plainfield, N.J.

Filed Mar. 9, 1970, Ser. No. 17,678
Int. Cl. B25b *7/02*
U.S. Cl. 254—78 **4 Claims**

A tool for tensioning and holding roller links of a roller chain in properly spaced relationship to provide for easy en-



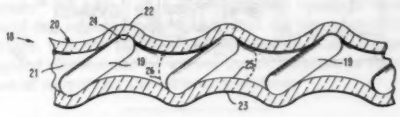
gagement or disengagement of a connecting link.

3,647,187

STATIC MIXER AND METHOD OF MAKING SAME

Robert E. Dannewitz, Yonkers, N.Y., and Albert M. Luongo, Emerson, N.J., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed Aug. 3, 1970, Ser. No. 60,474
Int. Cl. B01f *15/02*
U.S. Cl. 259—4 **7 Claims**



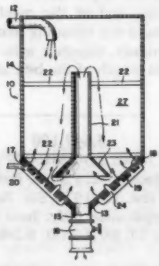
A static mixer and method of making the same which mixer is capable of simultaneously mixing together a plurality of fluids, usually at least two liquids, in a stream which may be segmented by a fluid which may be a gas, comprising one or more elements forming an elongated fluid passageway for conveying the fluids while at least two liquids are intermixed. A helix is formed within the passageway to impart a rotational movement to the stream so that the rotational velocity at the liquid-wall interface is greater than that at the center of the stream, providing an efficient mixing action, without breaking up the gas segments.

3,647,188

AIRLIFT BLENDING APPARATUS

Paul E. Solt, Allentown, Pa., assignor to Fuller Company

Filed Mar. 25, 1970, Ser. No. 22,640
Int. Cl. B01f *13/02*
U.S. Cl. 259—4 **6 Claims**



A blending apparatus for mixing dry powdered materials consisting of an upright silo with a gas-permeable divider and a gas supply providing fluidizing gas up through the divider.

A hollow blending column, open at its top and bottom, is vertically mounted in the silo with its bottom end spaced from the gas-permeable divider and gas is directed upwardly through the blending column at a velocity higher than the fluidizing gas velocity in the silo to circulate material from the silo upwardly through the blending column.

3,647,189

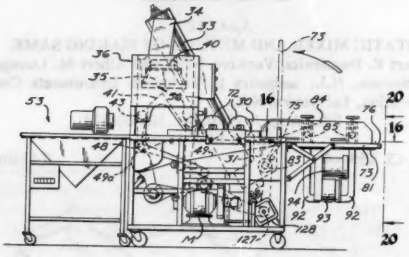
BREADING MACHINE

Richard T. Johnson, Sandusky, Ohio, assignor to Sam Stein Associates, Inc., Sandusky, Ohio

Original application June 27, 1968, Ser. No. 740,701, now Pat. No. 3,357,045. Divided and this application Jan. 12, 1970, Ser. No. 2,239

Int. Cl. B01f *7/02*

U.S. Cl. 259—45 **1 Claim**



A machine for coating a food product with breading material has an elevated hopper for storing the breading material and means for feeding the same in a smooth and controlled manner from the hopper, through a free-flowing downspout to be deposited on a belt beneath the food product, together with means for feeding the breading material in a smooth and controlled manner from the hopper to be deposited on top of the food product with a control valve at such outlet to control the rate of feed. A breading level plate is provided to maintain an even layer of breading material beneath the food product on the conveyor belt and this plate is resiliently mounted to relieve pressure of breading material building up behind the plate; and edge control plates are provided for preventing spillage of breading material at the sides of the conveyor belt. A hooded portion of open mesh belt conveyor is provided near the discharge end of the machine with air spray pipes above the belt to remove excess material, and the hood is adapted to be raised without interrupting the operation of the machine. In a modification, a flip bar is provided across the conveyor belt toward the discharge end of the machine to flip over the product so as to shake out breading material lodging in cavities of the food product, together with a novel arrangement for taking up excess length of the belt after it passes over the raised flip bar.

3,647,190

MIXING MACHINE FOR MEATS AND SAUSAGES

Adriano Iozzelli, Macalle 32, Pistoia, Italy

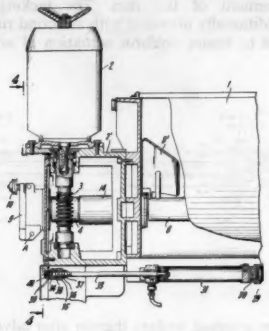
Filed Jan. 12, 1970, Ser. No. 2,326

Claims priority, application Italy, June 16, 1969, 4637 A/69

Int. Cl. B01f *7/00*; B29b *1/10*

U.S. Cl. 259—104 **9 Claims**

A mixing machine includes a pair of spaced counterrotating mixing shafts, mounting mixing paddles, disposed in parallel relationship within a vessel with a separate motor and transmission assembly located at each end of the shafts for rotating them. Each transmission assembly is located within a closed housing and a lubricant is contained in the housing for effecting continuous lubrication of the transmission assembly. A removable cover on the housing supports a part of the transmission assembly and provides means for compensating for axial thrusts on the mixing shafts. When the cover is opened it is possible to remove a portion of the



transmission assembly so that the mixing shafts are released for removal from the vessel. Displaceable closures are provided for openings in the lower part of the vessel for unloading and cleaning the vessel. The closures can be disassembled for complete cleaning of the vessel.

3,647,191

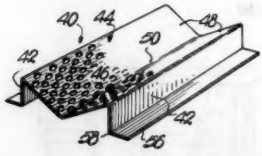
SPLASH BAR FOR COOLING TOWER FILL ASSEMBLY

Homer E. Fordyce, Kansas City, Mo., assignor to The Marley Company, Kansas City, Mo.

Filed July 27, 1970, Ser. No. 58,391

Int. Cl. B01f *3/04*

U.S. Cl. 261—111 **5 Claims**



A splash bar for a cooling tower fill assembly is formed from a synthetic resin sheet material and is of transversely M-shaped open base configuration. The sides of the bar are solid and vertically short relative to the horizontal distance between the sides spanned by the top, which is perforated and has a shallow, V-shaped, transverse configuration. Accordingly, the top presents a pair of inwardly sloping splash surfaces merging intermediate the sides to define a longitudinal channel along the top, three drip lines thus being provided at the channel and the two sides.

3,647,192

GAS-LIQUID CONTACTING TRAY

Johannes H. DeGroot; Hendrik J. Scheffer, and Willem H. Smit, all of Amsterdam, Netherlands, assignors to Shell Oil Company, New York, N.Y.

Filed Mar. 5, 1970, Ser. No. 16,798

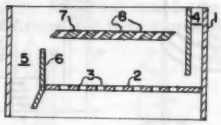
Claims priority, application Netherlands, Mar. 31, 1969, 16620

Int. Cl. B01d *3/16*

U.S. Cl. 261—114 R **6 Claims**

A tray for contacting liquids and gases comprising a gas-liquid contacting section having a plurality of apertures for

the passage of gas therethrough. At least one liquid supply inlet and at least one liquid discharge outlet is provided, the outlets being separated from the contacting section by a baffle plate disposed on the tray. A plate is disposed above the tray over the contacting sections thereof at a distance from the tray ranging between about one-half of the height of the



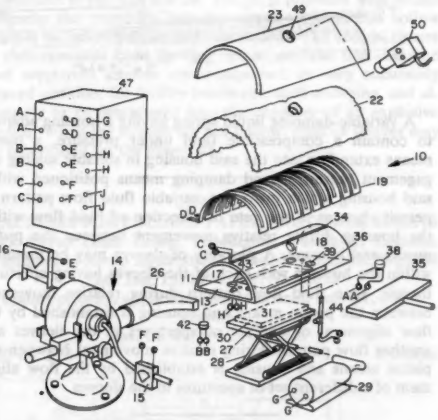
baffle plate and twice that height, the plate being provided with passage means whose walls are positioned obliquely in such a way that, to the mixture of gas and liquid flowing through those passages in the upward direction, a deflection may be imparted in the direction of the nearest liquid supply outlet.

3,647,193

FIRE SIMULATION FACILITY

E. Bruce Belason, Wilmington; George K. Castle, Chelmsford; Donald P. Crowley, Lowell, and Joseph V. Morgida, Billerica, all of Mass., assignors to Avco Corporation, Cincinnati, Ohio

Filed Nov. 3, 1969, Ser. No. 873,281
Int. Cl. F27b *3/00*
U.S. Cl. 263—1 **17 Claims**



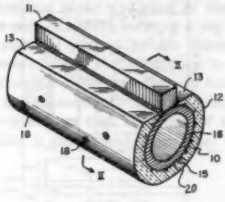
The invention relates to a fire simulation facility which accurately reproduces the thermodynamic and thermochemical parameters of a fire under controllable conditions. The facility utilizes a combination of a radiative and a convective heat source. The radiative source utilizes electrical resistance heater heating and a radiating surface having an emissivity of 0.8 to 0.9 or greater. The convective source generates hot gases in the form of chemical combustion products. The fire simulator also includes instrumentation for controlling the heat flux emanating from the heat sources.

3,647,194

PROTECTIVE REFRACTORY MEMBER

Louis E. Brungraber, Mt. Lebanon, and Walter Rudin, Whitehall, both of Pa., assignors to Bloom Engineering Company, Inc., Pittsburgh, Pa.

Filed June 1, 1970, Ser. No. 41,791
Int. Cl. F27d *3/02*
U.S. Cl. 263—6 B **5 Claims**



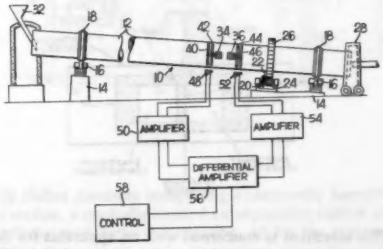
A protective refractory member for protecting heat absorptive elongated elements comprising a hollow refractory element into which is solidly embedded a reticulated metal structure. A series of spaced pluglike openings extend through the refractory element so that the reticulated metal structure, which is substantially adjacent the heat absorptive elongated element can be welded thereto to serve as the sole means of support for the refractory member.

3,647,195

APPARATUS FOR AND METHOD OF CONTROLLING ROTARY KILN OPERATION

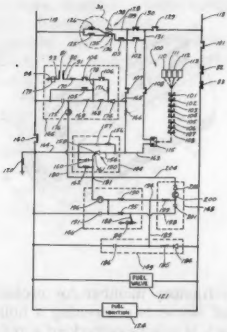
Hugh S. Drewry, Wauwatosa, Wis., assignor to Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

Filed May 1, 1970, Ser. No. 33,811
Int. Cl. F27b *7/20*
U.S. Cl. 263—33 **6 Claims**



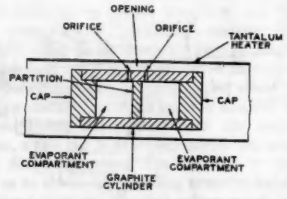
An apparatus for and method of controlling the operation of a cement kiln or the like in accordance with which means are provided for determining the temperature at two axially spaced locations within the calcining zone of the kiln, determining the differential between the temperatures measured at the two axially spaced locations as an indication of whether or not the burning zone of the kiln is located at a desired axial location within the kiln, and making proper control adjustment or adjustments to the kiln to maintain substantially constant the predetermined differential between the two measured temperatures, whereby to maintain the burning zone at the proper axial location within the kiln.

3,647,196
DRYER CONTROL SYSTEM
Curran D. Cotton, Newton, Iowa, assignor to The Maytag Company, Newton, Iowa
Filed June 15, 1970, Ser. No. 46,332
Int. Cl. F27b 7/00; F26b 19/00
U.S. Cl. 263—33 B **15 Claims**



A control system for a fabric-drying apparatus comprising an actuation circuit including an SCR operable for initiating termination of operation of the apparatus responsive to one of a plurality of condition-responsive trigger circuits. The SCR is effectively responsive to a preselected dryness condition of the fabrics, to an absence of flame at the fuel burner, or to a malfunction of the apparatus, for example, to initiate a shutting down of the apparatus.

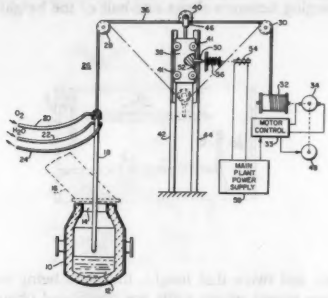
3,647,197
VACUUM DEPOSITION
Henry Holloway, West Bloomfield Township, Mich., assignor to Ford Motor Company, Dearborn, Mich.
Filed Apr. 27, 1970, Ser. No. 31,984
Int. Cl. F27b 14/04
U.S. Cl. 263—47 R **1 Claim**



This invention is concerned with an apparatus for depositing in vacuum an epitaxial layer of lead tin tellurides. This invention achieves a constant chemistry of the deposited film by evaporating the constituents of the film from an essentially integral and isothermal source.

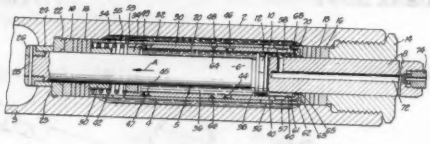
3,647,198
PROTECTIVE SYSTEM FOR BASIC OXYGEN FURNACE LANCE
William A. Munson, Williamsville, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Aug. 17, 1970, Ser. No. 64,445
Int. Cl. C21c 7/00
U.S. Cl. 266—34 LM **9 Claims**

A system for automatically and positively retracting a basic oxygen furnace lance upon the occurrence of a power failure. The system is mechanical, relying only on gravity to withdraw the lance, and eliminates the necessity for auxiliary



standby electrical and/or pneumatic equipment normally used to withdraw the lance when a power failure occurs.

3,647,199
VARIABLE-DAMPING LIQUID SPRING
Harish K. Bhutani, Downey, and Giles A. Kendall, Tarzana, both of Calif., assignors to Menasco Manufacturing Company, Los Angeles, Calif.
Filed May 7, 1970, Ser. No. 35,335
Int. Cl. F16f 5/00
U.S. Cl. 267—124 **14 Claims**

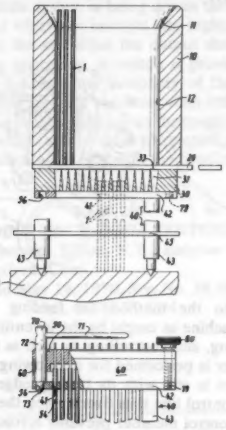


A variable-damping liquid spring having a housing adapted to contain a compressible fluid under pressure, a piston means extending into the said housing in slidable sealing engagement therewith, and damping means positioned within said housing which provide a variable fluid flow pattern to permit changes in the rate or direction of fluid flow within the housing during relative movement between the piston means and housing. A plurality of sleeves may be mounted within the housing with each of the sleeves having apertures therein. One fluid flow pattern during relative movement between the piston means and housing is established by the flow alignment of one set of apertures in the sleeves and another flow pattern during relative movement between the piston means and housing is established by the flow alignment of a different set of apertures in the sleeves.

3,647,200
APPARATUS FOR MAKING PROPELLANTS OF POWDER STRANDS
Gabriel Gross, Vichy, France, assignor to Manufacture de Machines du Haut-Rhin, Mulhouse-Bourtzwiller, France
Filed Aug. 3, 1970, Ser. No. 60,600
Claims priority, application France, Aug. 5, 1969, 69 26 815
Int. Cl. B23q 1/10, 7/04; B65b 35/34
U.S. Cl. 269—51 **11 Claims**

Apparatus for making propellants of powder strands. A plurality of outer strands of the same length are first placed generally in the form of a bundle in an open-topped vertical receptacle. The bottom end of the receptacle is closed by a plate which may be withdrawn when the strands are to be al-

lowed to fall into a strand-orienting fixture. The fixture is placed beneath the receptacle in alignment therewith, the fixture having a multiperforated upper plate with vertical, funnel-shaped openings therethrough which receive the lower ends of the strands therein when the combination of receptacle and fixture are vibrated, whereby to guide strands through such openings and downwardly into contact with a supporting plate. The powder strands in the embodiment shown are hollow. After all of such openings are closed by the upper ends of the forwarded strands, the receptacle is removed from the fixture, and there is applied to the upper



end of the fixture a jig or second fixture carrying a plurality of spaced mandrels, when the strands are hollow, which are introduced into the upper ends of the hollow strands now positioned in the first fixture. The jig is provided with means whereby the mandrels grip the upper ends of the hollow strands sufficiently to support the strands. The second fixture is then removed from the first fixture, and the thus-oriented and supported strands are transported, in very accurately spaced position, for further treatment, such as drying, and ultimately to be introduced into the chamber of an explosive device. When the strands are not hollow, rings or sleeves may be substituted for the mandrels.

3,647,201

MACHINES FOR FOLDING PAPER AND OTHER SHEETS

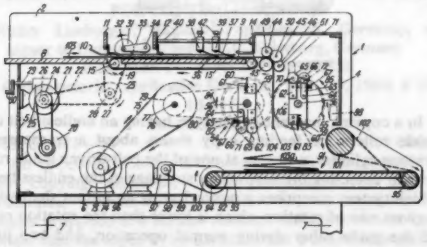
Jack Voyna Leslie Kemp, Toddington, Dunstable, England, assignor to Kemp Applications Limited, Dunstable, England

Filed Jan. 15, 1970, Ser. No. 3,022

Claims priority, application Great Britain, Feb. 21, 1969, 9,566/69

Int. Cl. B65h *45/16, 45/20*

U.S. Cl. 270—73 **9 Claims**



A machine for folding a sheet with a concertina fold comprises a pair of rotary creasing devices each of which includes an axially extending male creasing member and an axially extending female creasing member arranged so that on rotation of the devices the male and female members of the two devices mate with each other alternately and produce creases alternately in opposite directions in a sheet which is fed freely between the creasing devices by a feeding mechanism. The speed by which the sheet is fed by the feeding mechanism is adjustable and the speed of rotation of the creasing devices is constant so that the space between adjacent creases can be adjusted by adjusting the speed of the feed mechanism. Each of the male creasing members consists of an axially extending blade and each of the female members comprises a pair of rollers forming a nip between them into which the sheet is pushed by the blade of the other device as the devices rotate. The rollers are rotated contra to each other to draw the sheet into the nip between them to form the crease and subsequently the direction of rotation of the rollers is reversed so that the part of the sheet held between the rollers is discharged again after the crease has been formed.

3,647,202

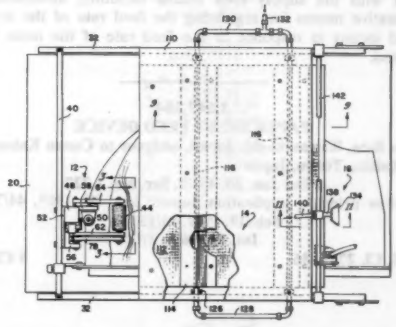
PLY SHIFTER ASSEMBLY

Herbert V. Jacobs, Greenhill Apts., Apt. WA602, 1001 City Ave., Lower Merion, Pa., and Eric Winston, Melrose Park, Pa., assignors to Herbert V. Jacobs

Filed Feb. 11, 1970, Ser. No. 10,535

Int. Cl. B65h *3/52*

U.S. Cl. 271—19 **5 Claims**



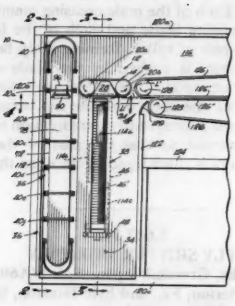
A ply shifter assembly comprising a rearwardly located ply shifter station, a centrally located air separation station and a forwardly located flutter tube station, all for the purpose of facilitating the separation of a topmost or otherwise exposed ply of goods from the remaining workpieces that have been assembled into a stack so that forward delivery of the workpiece is not impeded by the normal adherence inherent in many materials that are superimposed into a stack. The ply shifter station includes an actuator to drive a workpiece-contacting roller, as well as a clamp to hold down the remaining plies in the stack during the delivery of a workpiece. The air separation station involves means to discharge jets of air that will create currents to attract the topmost or exposed workpiece and cause it to become separated from the next workpiece in the stack. The flutter tube station is comprised of a fan-shaped discharge port that directs a stream of air forwardly and downwardly to loosen the leading edge of the workpiece.

3,647,203

APPARATUS FOR FEEDING LETTER ENVELOPES OR THE LIKE

John Randle De Hart, 4125 Pinta Ct., Coral Gables, Fla.

Filed Jan. 8, 1970, Ser. No. 1,347
Int. Cl. B65h *1/14, 3/12*
U.S. Cl. 271—30 A 12 Claims



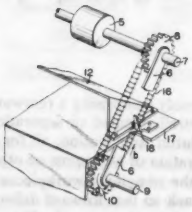
Work station apparatus for individually successively feeding elongate planar work items such as letter envelopes including main feed means including ported vacuum belt means for rapidly successively endwise edgewise shifting a continuous supply of work items and including supply feed means for progressively broadwise advancing a juxtapositioned supply of envelopes or the like to the main feed means and with the supply feed means including automatically operative means for regulating the feed rate of the supply feed means in response to the feed rate of the main feed means.

3,647,204

PAPER SHEET FEED DEVICE

Jiro Sato, Kawasaki-shi, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 20, 1970, Ser. No. 4,227
Claims priority, application Japan, Jan. 28, 1969, 44/7826; Feb. 19, 1969, 44/15144
Int. Cl. B65h *3/06*
U.S. Cl. 271—36 5 Claims



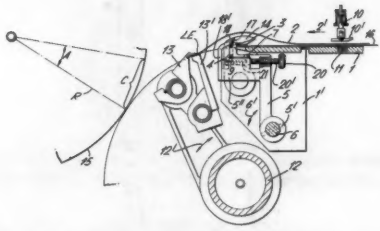
Paper sheet feed device includes a plurality of paper sheet feed means disposed such that each means can feed paper sheets having a predetermined size. When paper sheets are supplemented or replaced by the sheets of other size, the paper feed means is moved from its operative position to nonoperative position, but the paper sheets have been supplemented or replaced, the paper sheet feed means is automatically returned to its operative position with the aid of pawl members and ladder chain cooperating with feed means.

3,647,205

METHOD AND APPARATUS FOR FEEDING OF SHEETS FITTINGLY ALIGNED TO A MACHINE

Helmut Schone; Gunter Weisbach; Hans Johne; Fritz Kuhn, and Werner Lein, all of Radebeul, Germany, assignors to Veb Polygraph Leipzig, Kombinat fuer Polygraphiche Maschinen und Ausrustugen, Leipzig, Germany

Continuation-in-part of application Ser. No. 731,805, May 24, 1968, now abandoned. This application May 15, 1970, Ser. No. 37,602
Int. Cl. B65h *43/08*
U.S. Cl. 271—57 3 Claims



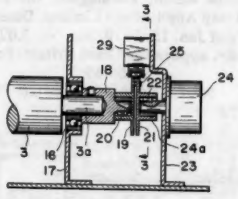
According to the method for feeding sheets fittingly aligned to a machine as taught by the invention, the sheet advancing, aligning, and controlling, as well as the moving of a control member is performed for a following sheet while the preceding sheet is still with its trailing edge upstream of a reference or control line thus overlapping the following sheet whereby the control member prevents erroneous indications for a following sheet by the preceding sheet. The present apparatus comprises journaled lever means which move said control member into and out of the path of a light beam to prevent a light reflection by a preceding sheet when a following sheet is out of alignment or absent.

3,647,206

MEANS FOR DETECTING SLIPPAGE OR STOPPAGE OF ENDLESS BELT IN COPYING MACHINE

Hideo Hashimoto, Koshigaya, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed Aug. 3, 1970, Ser. No. 60,567
Claims priority, application Japan, Aug. 14, 1969, 44/63865
Int. Cl. B65h *7/00*
U.S. Cl. 271—57 10 Claims



In a copying machine of the type having an endless belt on guide rollers for feeding copy sheets about a transparent printing cylinder, a system at one of the belt-driven guide rollers for detecting the slippage or stoppage of the endless belt, which system comprises a motor having an output shaft with a given rate of rotation which is lower than the rotation rate of the guide roller during normal operation, and two juxtaposed cam plates, one connected through a one-way clutch to the shaft of the guide roller and the other connected through a one-way clutch to the output shaft. The two plates are coupled for rotation together by a pin which projects

from one into an arcuate slot in the other. When the roller is turning faster than the motor shaft, the roller clutch engages, causing the two cam plates to be driven in unison at the roller rotation rate by engagement of the pin with one end of the slot while the output shaft clutch is disengaged. If the rotation rate of the guide roller drops below that of the output shaft, relative rotation between the plates causes the pin to engage the opposite end of the slot, thereupon causing the output shaft clutch to engage to drive the plate system, while the roller clutch disengages. The periphery of each cam plate is provided with a recess, which recesses are out of register when the cam plate system is being driven through the guide roller clutch, but which are brought into register by the shifting of the pin in the slot when the output shaft clutch takes over the driving operation. A switch is provided having an actuator, riding on the outer periphery of the rotating cam plate, which drops into the recesses when indexed, giving a signal that indicates the slippage or stoppage of the belt on the roller and which can be used to operate associate components in the machine to deal with the condition.

3,647,207

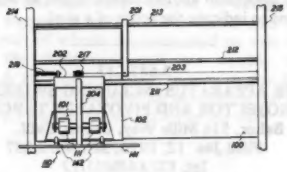
SHEET-FEEDING MECHANISM CENTERING DEVICE

Donald F. McPherson, Hilton, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 18, 1970, Ser. No. 38,465

Int. Cl. B65h *1/04*

U.S. Cl. 271—61 **4 Claims**



Apparatus for reliably locating the feed rollers and paper snubbers of a copier about the centerline of sheets contained in a cassette in response to the cassette being loaded into the copier regardless of the size of the cassette so that the feeding mechanism feeds sheets as needed from the cassette to the copier in correct alignment.

3,647,208

COMBINED SEPARATING AND DEFLECTING DEVICE FOR COPYING MATERIALS, MORE PARTICULARLY FOR COPYING MACHINES

Walter Limberger, Hamburg-Poppenbuttel, Germany, assignor to Lumoprint Zindler KG, Hamburg, Germany

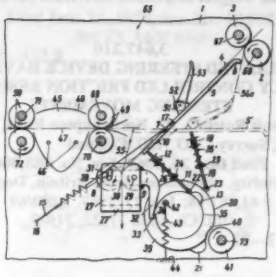
Filed Mar. 17, 1970, Ser. No. 20,255

Claims priority, application Germany, Mar. 19, 1969, P 19 13 811.5

Int. Cl. B65h *29/64*

U.S. Cl. 271—64 **11 Claims**

An improved combined separating and deflecting device for copying materials, more particularly for copying machines, wherein a combination of two superimposed sheets is applied at a certain velocity, the improvement comprises that the sheet to be deflected has a lead and is guided between two cooperating separating rollers of which at least one is mounted pivotably and is driven at a higher peripheral speed that the speed of the transport means for the copying materials, comprising a guide adapted to be pivoted towards the sheet to be deflected in accordance with the state of engagement of the separating rollers, the guide guiding the



other sheet in its direction and being fixed resiliently in its end positions by an overcentering device.

3,647,209

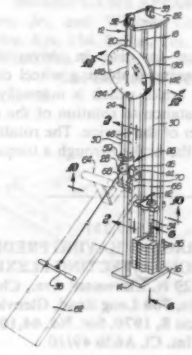
WEIGHT LIFTING TYPE EXERCISING DEVICE

Jack La Lanne, 5224 Santa Monica Blvd., Hollywood, Calif.

Filed May 15, 1970, Ser. No. 37,553

Int. Cl. A63b *21/06, 21/00*

U.S. Cl. 272—58 **18 Claims**



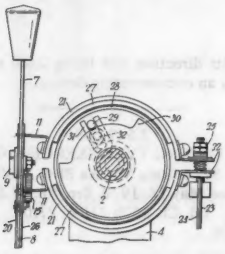
An exercising device for lifting weights with a cable that is supported by and guided over an upright frame. A vertically movable carriage engages an upright post of the frame, means for guiding the cable to position its free end at different elevations above ground, and a locking pin mounted to the carriage for horizontal axial movement of the pin into engagement with any one of a plurality of vertically spaced apertures in the vertical post. Means are provided for biasing the pin into an aperture-engaging position, for withdrawing it therefrom, and for locking it in its aperture-engaging position. The carriage includes apertured ears for positioning an upwardly extending balanced bar resting on the ground. The end of the cable remote from the carriage has a weight-connecting member that extends through central apertures in a plurality of vertically spaced weight plates that include vertically arranged, radially outwardly extending cutouts and suitable undercuts so that an angular displacement of the member about its axis through 90° engages a protrusion projecting from the member with one of the weight plates for movement of the weight plate, together with the plates above it, with the cable. Means are provided for locking the weight connecting member in its weight plate engaging position. The

member includes markings indicating the weight connected thereto. The cable is guided through and engaged by an indicating mechanism which signals the number of times the cable and the weights suspended therefrom have been lifted.

3,647,210
SIMULATED STEERING DEVICE HAVING A MANUALLY CONTROLLED FRICTION RESISTANCE TO STEERING MOVEMENTS

George Dennis Ratcliffe, 43, Northampton Road, Addiscombe, Croydon, Surrey CRO 7HD, England

Filed Dec. 24, 1969, Ser. No. 888,008
Claims priority, application Great Britain, Dec. 24, 1968, 61,467/68; Jan. 17, 1969, 3,000/69
Int. Cl. A63b *21/22*, *21/00*
U.S. Cl. 272—83 A 7 Claims

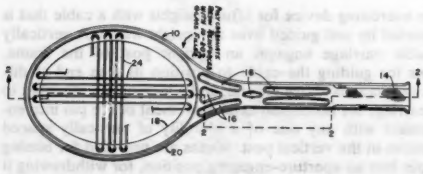


A portable device for use in driver instruction or physiotherapy and having a steering wheel connected by a friction spindle to a brake which is manually adjustable to vary the friction resistance to rotation of the steering wheel encountered by a user of the device. The rotation of the spindle is transmitted to the brake through a torque transmission spring.

3,647,211
PLASTIC TENNIS RACKET HAVING PREDETERMINED CROSS SECTIONS EFFECTING FLEXIBILITY

James H. Doessel, 7429 N. Claremont Ave., Chicago, Ill., and Patrick A. McKenna, 708 Long Road, Glenview, Ill.

Filed June 8, 1970, Ser. No. 44,109
Int. Cl. A63b *49/10*
U.S. Cl. 273—73 C 5 Claims

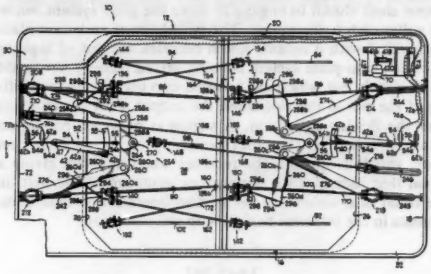


A tennis racket frame of molded plastic includes head, shaft and handle portions with the cross sections thereof, together with the characteristics of the plastic material, providing maximum flex at the upper end of the head, secondary flexing at the throat area adjacent the head, lesser flexing at the base of the head, and the minimum of flexing at the shaft adjacent to handle. Shaft apertures and texturing of the handle can be molded in at the same time that the proper cross-sectional areas of these parts are formed. The cross-sectional area of the head is T-shaped and the string apertures are bridged by guides about which the strings extend in order to reduce wear thereof.

3,647,212
HOCKEY GAME

Gordon A. Barlow, Evanston, and Marvin I. Glass, Chicago, both of Ill., assignors to Marvin Glass & Associates

Filed June 1, 1970, Ser. No. 41,885
Int. Cl. A63f *7/06*, *7/12*
U.S. Cl. 273—85 B 17 Claims

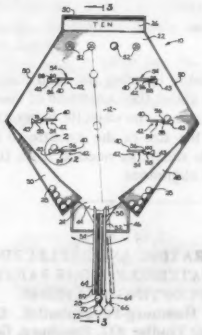


An improved game of the table hockey type characterized by the provision of linkage arrangements for operating simulated hockey players which require reduced to and fro movement to accomplish full to and fro movement of the players and wherein some controls operate more than one player. In addition, the hockey game is provided with a timekeeping device and associated audible signal means as well as audible signal means to indicate the score of a goal.

3,647,213
GAME APPARATUS INCLUDING SWIVELABLE PROJECTOR AND PIVOTABLE TARGETS

Donald L. Baker, 516 Mills Way, Goleta, Calif.

Filed Jan. 12, 1970, Ser. No. 2,257
Int. Cl. A63b *65/12*
U.S. Cl. 273—101 9 Claims



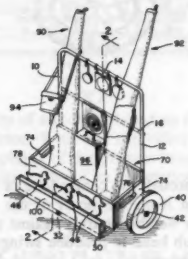
A game apparatus to be played with a spherical playing object having an inclined ramp playing surface, a plurality of playing object retaining devices upon the playing surface, a portion of the retaining devices including pivotal levers which upon contact on one end thereof is capable of effecting dislodgment of a resting playing object located at the other end of the lever, a playing object propelling device to move a playing object upon the inclined ramp playing surface against the pull of gravity, the propelling device being swivelable within an arc to be capable of catching a returning playing object and effect replay of the object.

3,647,214

PORTABLE SHOOTING GALLERY AND GUN CART

John F. Hohmann, 403 Beech Ave., Takoma Park, Md.

Filed Apr. 21, 1970, Ser. No. 30,387
Int. Cl. F41j 7/00
U.S. Cl. 273—105.6 5 Claims



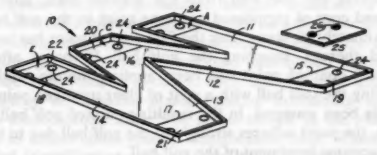
An open framework includes spaced side portions, spaced bottom portions, and spaced horizontal portions, said horizontal portions having targets supported thereby. A front angle portion is connected to the forward ends of the bottom portions and pivotally supports targets thereon which are spring urged into operative position. A swingable support member is supported by the underside of said front angle portion. A pair of wheels are supported on axle means provided on the framework and are readily detachable therefrom. A removable support means in the form of an open top container is provided for supporting the lower ends of guns and for carrying ammunition or the like.

3,647,215

SURFACE PROJECTILE GAME BOARD HAVING INTERCHANGEABLE SCORING BOARD MEMBERS

Helen Sterlicchi, and Pasquale J. Sterlicchi, both of 11649 Downey Ave., Downey, Calif.

Filed Apr. 30, 1970, Ser. No. 33,328
Int. Cl. A63d 3/00; A63f 7/14
U.S. Cl. 273—123 R 2 Claims



A game device of a character having extended leg portions configuration with sidewalls on a similarly shaped structure to confine a ball or puck.

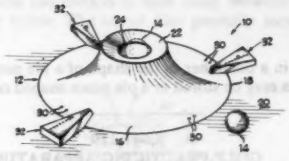
At the ends of the leg portions of the game structure are openings for interchangeable game-scoring members having either circles imprinted thereon or openings therein for the ball or puck to come to rest upon while within. The ball of the game and also puck, if used, are propelled by a suitable instrument which upon impact will propel the ball towards a circle or an opening whichever the case.

3,647,216

TARGET GAME FOR ROLLING MISSILE

Jeffrey D. Breslow, Chicago, Ill., assignor to Marvin Glass & Associates

Filed June 22, 1970, Ser. No. 48,078
Int. Cl. A63f 9/00
U.S. Cl. 273—123 R 3 Claims



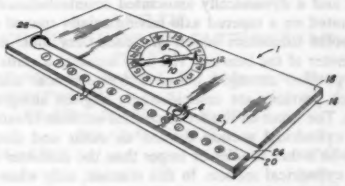
A target game characterized by the provision of a target member having a base for disposition on a horizontal surface and upwardly curved sides, terminating in a central opening. The game is further provided with divider elements for attachment to the periphery of the base for dividing the periphery into sectors corresponding to the number of participants in the game. The object of the game is for a participant to attempt to roll a ball up the sides of the base so that it will occupy the elevated central opening.

3,647,217

BOARD GAME APPARATUS

Leon Williams, Jr., and William Gerbetz, both of 3414 Tribune Drive, Apt. 134, Dallas, Tex.

Filed Feb. 4, 1970, Ser. No. 8,495
Int. Cl. A63f 3/02
U.S. Cl. 273—134 G 7 Claims



A game apparatus comprising a game board having an elongated groove formed therein, a pointer pivotally mounted on the board, position indicators on the board adjacent the groove, and corresponding indicia positioned around the pointer. The groove has a bottom which is wider than the opening formed in the surface of the board allowing a game piece to be inserted only at an end of the groove and moved therealong for removal at the other end of the groove. The game piece is recessed in the groove such that a deliberate act is required to move the game piece through the groove.

3,647,218

PAN PUZZLES

Charles F. Foley, 3908 Merriam Road, Minnetonka, Minn.; Charles D. McCarthy, Route #3 Box 217 8A, Wayzata, Minn., and Neil W. Rabens, 1106 Woodhill Road, Burnsville, Minn.

Filed Feb. 24, 1970, Ser. No. 14,265
Int. Cl. A63f 9/10
U.S. Cl. 273—157 R 3 Claims

A small child's picture puzzle having a picture on a planar member which is made into pieces shaped in the form of a piece of pie, with straight edges, a center, and which do not

interlock. The puzzle pieces fit together to form a substantially circular outer periphery and a plurality of puzzles nest

together in a container in the shape of a pie pan. Alternately the pieces may be stored in a pie piece shaped container.

3,647,219

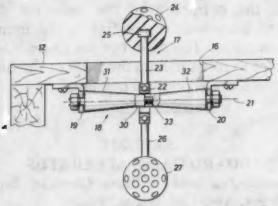
GOLF-PRACTICING APPARATUS

Hugh M. Ravatt, Aurora, Colo., assignor to John P. Kreisheimer, a part interest

Filed Dec. 31, 1970, Ser. No. 103,103

Int. Cl. A63b *69/36*

U.S. Cl. 275—185 D **10 Claims**



As a preferred embodiment of the invention disclosed herein, a circular bearing carrying at least one simulated golf ball and a dynamically associated counterbalance is loosely mounted on a tapered axle having axially spaced sections of different diameters which are each less than the internal diameter of the bearing. The axle includes a central cylindrical portion arranged between frustoconical end portions, which portions are coincidentally aligned along a common axis. The taper of the frustoconical sections is outward from the cylindrical section toward an outer end diameter that may be either smaller or larger than the diameter of the central cylindrical section. In this manner, only when the ball is struck squarely will the ball rotate about the axle without either wobbling or carrying the rotating assembly laterally along the axle to a different position. On the other hand, when the ball is struck offcenter, the rotating assembly will seek an axial position along the tapered axle which is representative of the misdirection of the golfer's swing.

3,647,220

GOLF PRACTICE SWING WEIGHT

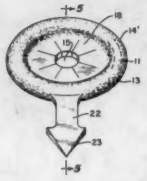
Joseph A. Burkart, 125 Turner Pl., and Gerald A. O'Connell, 118 Nichols Drive, both of Sycamore, Ill.

Filed Mar. 18, 1970, Ser. No. 20,722

Int. Cl. A63b *69/36*

U.S. Cl. 273—194 A **14 Claims**

This practice weight is basically a disk of molded rubber based plastic material having a circular rim in which a metal ring is encased concentrically with the disk, the disk having a center hole and radial slits extending therefrom to the rim portion to provide resilient friction tabs or fingers that are yieldable in both directions permitting slipping the practice weight on over the handle grip down to the head for practice swings and later removal of the practice weight in the reverse direction, the tabs or fingers engaging the hosel firmly enough to hold the practice weight in place properly during the practice swings. An elongated radially outwardly extending rubber based plastic tab can be molded in one piece with the disk ending in an outwardly tapered pointed wedge, this tab being long enough to permit bending it into a semicircle behind the head after the practice weight is in place at or adjacent the head on an iron, when the pointed end of the



wedge is forced through the center hole of the disk upwardly far enough to jam it on the hosel of the club and thereby fasten the practice weight securely against slipping down past the heel of the club head in practice swings and coming into contact with the ground.

3,647,221

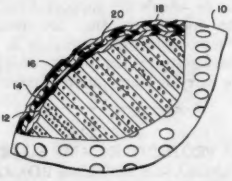
PAINTED GOLF BALL METHOD AND STRUCTURE

Danforth Holley, Grosse Pointe Shores, Mich., assignor to Holley Plastics Company, Warren, Mich.

Filed Sept. 15, 1969, Ser. No. 857,778

Int. Cl. A63b *37/00*; B44d *1/092*

U.S. Cl. 273—235 **12 Claims**



A method of producing a urethane painted solid polyurethane golf ball and the resulting structure. The steps in painting a solid polyurethane golf ball include soaking the golf ball in an acetone bath for approximately 20 minutes with intermittent agitation, applying a first coat of pigmented urethane paint to the golf ball approximately 5 hours after removing the golf ball from the acetone bath, applying a second coat of pigmented urethane paint to the golf ball approximately 10 hours after the first coat of paint has been applied thereto, stamping the golf ball 10 hours after the second coat of paint has been applied thereto, and clear coating the golf ball with a coat of clear urethane paint after it has been stamped. In the resulting painted golf ball structure, the paint adheres strongly to the golf ball due to the initial acetone treatment of the golf ball.

3,647,222

ORIENTATION INDEPENDENT PHONOGRAPH

Jack L. Kelly, Bethel Park, Pa., and Ronald K. Wiandt, Decatur, Ill., assignors to General Electric Company

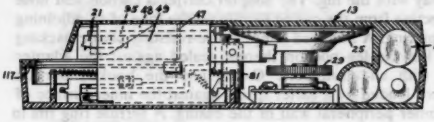
Filed Jan. 6, 1969, Ser. No. 789,247

Int. Cl. G11b

U.S. Cl. 274—1 R **3 Claims**

In a miniature record player for reproducing diminutive records, there is provided a rotatable turntable and a pivoted tone arm. A pickup cartridge is mounted on the tone arm for playing records positioned on the turntable. The tone arm is counterbalanced and spring biased so that the pickup cartridge is resiliently urged into playing engagement with a

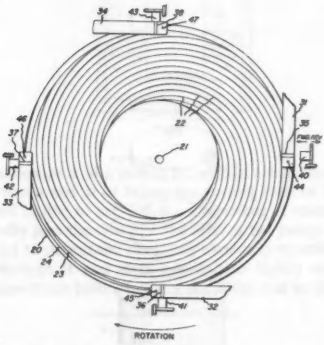
record propelled by the turntable. A peripheral bearing surface is provided on the turntable to enable the turntable to maintain vertical stability when the player is inverted. One or more other bearing surfaces are also provided for maintaining vertical stability of a record placed on the turntable when the player is inverted. With this simplified arrangement, the miniature record player of the present invention may readily play records independently of its orientation.



3,647,223
SELECTIVE AUDIO PLAYBACK APPARATUS

David J. Ben Daniel, Schenectady, N.Y.; John R. Morgan, Phoenix, Ariz., and John O. Fielding, Ballston Lake, N.Y., assignors to General Electric Company

Filed May 26, 1969, Ser. No. 827,794
Int. Cl. G11b *17/06*
U.S. Cl. 274—9 R **5 Claims**



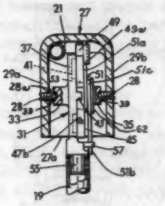
Audio playback apparatus is described including phonograph means having a permanent magnet mounted in the pickup arm and a solenoid affixed at one side of the turntable for attracting or repelling the permanent magnet on the arm. The phonograph disk itself comprises information recorded in nested spiral-shaped grooves, each spiral-shaped groove intersecting an annular master groove containing spiral groove identification data. The stylus travels in the master groove to detect spiral groove identification data. When the recorded identification data matches the selected data, the solenoid repels the magnet, moving the pickup arm inward toward the center of the disk and into the selected spiral groove to reproduce the information recorded in the selected spiral groove.

3,647,224
VISCOUS DAMPED PIVOT SYSTEM FOR A PHONOGRAPH TONE ARM

Keith W. Klein, Simsbury, Conn., assignor to General Electric Company

Filed Feb. 8, 1970, Ser. No. 1,403
Int. Cl. G11b *3/10*
U.S. Cl. 274—23 R **10 Claims**

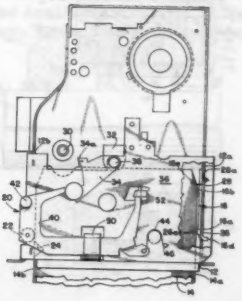
A pivotal supporting arrangement for a phonograph tone arm is provided. This arrangement incorporates a stator having a channel therein for receiving a viscous damping fluid. The stator is structured to pivotally support a phonograph tone arm. A drag disc having a pickup tab formed on it is coaxially disposed relative to the stator and slidably engages the damping fluid in the stator channel. With this approach, an actuating portion of the tone arm housing acts upon the pickup tab of the drag disc during movement of the tone arm about its horizontal axis, with the disc sliding on the damping fluid to provide lost motion or time delay between the tone arm and the stator. The stator also pivotally supports the tone arm for movement about a horizontal axis. A control spring is attached to the drag disc to enable the operator to select the desired amount of drag for exertion upon the tone arm. A stop tab on the stator is also provided for limiting movement of the drag disc with respect to the stator during vertical movement of the free end of the tone arm toward the turntable. The physical relationship of the actuating portion of the tone arm housing and the pickup tab of the drag disc is such that the viscous damping system is operationally disconnected from the tone arm when the stylus of the tone arm is in contact with a record surface.



3,647,225
LOW-FRICTION GUIDE FOR CARTRIDGE TAPE PLAYER

Donald J. Dattilo, Mt. Prospect, Ill., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Feb. 2, 1970, Ser. No. 7,917
Int. Cl. G11b *5/00*
U.S. Cl. 274—4 R **7 Claims**

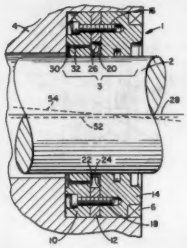


A cartridge-type magnetic tape player is provided with a snap-in guide member which is removably fastened to one of the sidewalls of the entryway of the tape player so that when a cartridge is inserted into the entryway and moved therealong the guide member will provide a low-friction guide surface for the cartridge.

3,647,226
SEALING CARTRIDGE ASSEMBLY AND RING ELEMENT THEREFOR

James H. Middelkoop, Woodland Hills, and Edward J. Bigelow, Torrance, both of Calif., assignors to North American Rockwell Corporation

Continuation of application Ser. No. 583,879, Oct. 3, 1966, now abandoned. This application May 7, 1970, Ser. No. 37,380
Int. Cl. F16j 9/02, 9/20
U.S. Cl. 277—35 16 Claims

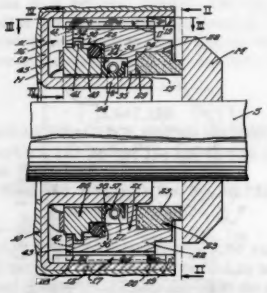


A sealing cartridge assembly is disclosed for use between a cylinder housing and a piston shaft movable relative thereto. The assembly comprises a cartridge removably supported on the cylinder housing and having an annular cavity within which a sealing ring is contained. The stated ring is deformed by forcible contact with the cavity walls, causing the ring to bear against the piston shaft with a different contact area than when in the undeformed state. The ring is radially movable within the cavity to insure continuous sealing contact during conditions of misalignment, out-of-roundness, or bending of the piston shaft.

3,647,227
TWIN TAKE-APART HIGH-TEMPERATURE SHAFT SEAL

Bruno V. Lojkutz; Dale J. Warner, both of Chicago, and George H. Schulz, Naperville, all of Ill., assignors to Gits Bros. Mfg. Co., Chicago, Ill.

Filed May 15, 1970, Ser. No. 37,652
Int. Cl. F16j 15/02
U.S. Cl. 277—40 8 Claims

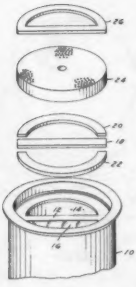


A face-type high-temperature resisting shaft seal which can be disassembled without removal of its outer shell or casing from a housing, gearbox or the like in which it is pressed and having a unitary multiple-part inner seal assembly which is easily separated into its components after removal from the shell or casing. The casing is U-shaped, opening in an axial direction, and has one or more keys lugs extending longitudinally on the inner face of the outer wall, each with a crosshead at its outer end. The inner assembly includes an adapter ring with a slot or keyway for each lug wide enough to clear the crosshead. The adapter is retained in the casing by the crosshead when rotated to abut one side of the keyway with the lug. The adapter carrier a carbon seal nose projecting from the casing to ride on the face of an adjoining mating ring. A J-shaped temperature-resisting plastic packing ring has the leg portion thereof sealed against the adapter ring with an elastomeric O-ring and the hooked portion thereof loaded by a garter spring against the inner surface of the inner peripheral wall of the casing. A ferrule ring fits in the adapter and is pressed by a wave spring against the elastomer O-ring to seal the J-packing against the adapter ring. This ferrule has one or more radially projecting ears fitting in a groove at the back end of the adapter ring and this groove is slotted at intervals to permit assembly of the ferrule into the adapter. Thus each of the components of the inner assembly can be separated by rotating the ferrule to a align the ears thereof with the gaps in the adapter permitting the ferrule to drop out of the adapter.

3,647,228
CERAMIC REGENERATOR SEALS

Donald J. Cassidy, Plymouth, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed July 9, 1970, Ser. No. 53,616
Int. Cl. F16j 15/54
U.S. Cl. 277—96 6 Claims



A monolithic seal member made of zinc oxide is positioned in the housing of a gas turbine engine where the seal member rubs against a rotating ceramic regenerator. The seal member has excellent friction and thermal shock characteristics that make it uniquely suited for use in the gas turbine engine. Adding small amounts of calcium fluoride to the seal member reduces the coefficient of friction without changing significantly the thermal shock characteristics. The zinc oxide also can be applied as a coating to a ceramic substrate.

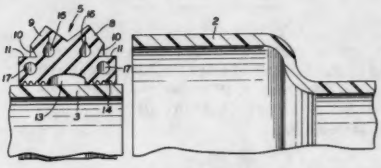
3,647,229
RESILIENT CONDUIT SEAL

Kenneth Grimes, Streetsboro, Ohio, assignor to Hamilton Kent Manufacturing Co., Kent, Ohio

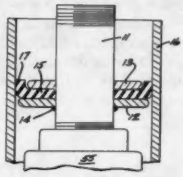
Filed Feb. 12, 1970, Ser. No. 10,952
Int. Cl. F16j 15/10
U.S. Cl. 277—207 11 Claims

The seal is for use between the bell of one of two telescoped pipe ends and the spigot of the other pipe end. It is symmetrical and comprises a plurality of encircling perforate ears on its outer surface, with the tips of the ears in pressure contact with the inner surface of the bell. There is preferably a single tubular opening located radially inward

from each tip and also a tubular opening near each edge of the seal below the above-mentioned openings. The inner surface of the conduit seal is preferably serrated and indented at the central portion.

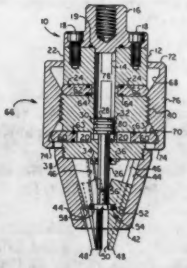


3,647,230
WELL PIPE SEAL
William L. Smedley, 245 Graham Road N.W., Grand Rapids, Mich.
Filed July 24, 1969, Ser. No. 844,333
Int. Cl. F16j 9/08, 15/32
U.S. Cl. 277—212 7 Claims



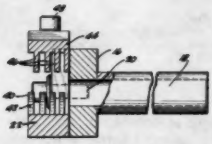
The disclosure is of a seal to be used in a well immediately above a pump and at or below the normal level of the water in the well casing to prevent the movement of water and air downwardly past the seal into the area of the pump. The seal is designed to permit the necessary service connections to be passed through it and then adjusted to tightly seal about these connections before installation of the seal in the well.

3,647,231
SELF-CONTAINED HYDRAULIC SYSTEM FOR FLUID-ACTUATED CHUCK
Thomas W. Schafer, Chula Vista, Calif., assignor to Rohr Corporation, Chula Vista, Calif.
Filed Feb. 13, 1970, Ser. No. 11,090
Int. Cl. B23b 31/30
U.S. Cl. 279—4 3 Claims



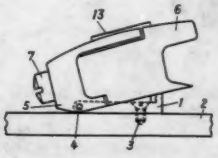
Chuck includes cylindrical housing with central bore and two sets of holes extending from the bore to side surface of housing, said sets being spaced apart axially of the housing and the holes in each set being spaced apart circumferentially thereof. Actuating pistons are disposed in said holes and project from side surface of housing, and a drive piston is disposed in bore between two sets of holes. A collar is mounted on housing for movement axially thereof and has on its inner side cam surfaces which slope relative to side surface of housing and respectively engage projecting ends of actuating pistons in two sets of holes. Fluid disposed in bore between actuating pistons and drive piston cause latter to move axially of bore when collar moves axially of housing and thereby forces one set of actuating piston toward bore while permitting other set of actuating pistons to move away from bore. A collet having jaws therein is attached to housing, and shaft connected to drive piston varies spacing between jaws when drive piston moves in bore.

3,647,232
TOOLHOLDER
Dwayne Roy Anderson, Sylmar, Calif., assignor to George D. Hayes, Sun Valley, Calif., a part interest
Filed Jan. 8, 1970, Ser. No. 1,508
Int. Cl. B23b 29/08, 31/04
U.S. Cl. 279—68 2 Claims



A toolholder for retaining a cutting tool is disclosed for use in automatic screw machines, turret lathes, or the like. The toolholder includes a hollow tubular member adapted to be inserted into the turret of the machine tool. A baseplate is mounted to the tubular member and has an opening therein which communicates with the hollow portion of the tubular member. A first set of jaws is fixedly mounted to the baseplate and a second set of jaws is adjustably mounted to engage the first set of jaws. Each set of jaws includes a plurality of teeth which are adapted to interleave with opposing teeth.

3,647,233
SAFETY SKI BINDING
Hans Martin, Volkmarstrasse 6, Zurich, Switzerland
Filed Apr. 30, 1970, Ser. No. 33,264
Claims priority, application Switzerland, May 9, 1969, 7173/69
Int. Cl. A63c 9/00
U.S. Cl. 280—11.35 T 9 Claims



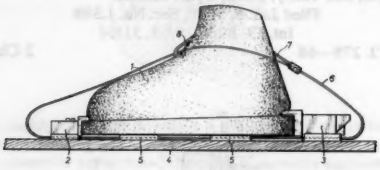
A safety ski binding of the type incorporating at least one securing head into which there can be inserted the ski boot, this securing head being raisable at the side of the ski boot and incorporating two retaining arms, the free ends of which hold or secure the ski boot, these retaining arms being laterally pivotable for the purpose of releasing the ski boot.

According to important aspects of the invention the securing head is equipped with a latching or locking mechanism which fixes the securing head in its lowered position, such latching mechanism engaging with predetermined locations of said retaining arms. The latching mechanism is subjected to the counter force of at least one spring member, so that upon exceeding the adjusted force this spring member releases the latching mechanism and therefore the securing head.

3,647,234
SKI BINDING WITH FRICTION-REDUCING MEANS BETWEEN SKI BOOT AND SKI

Ernst Gertsch, Sporthaus Central, Wengen, and Ulrich Gertsch, 461 G, Aenderbergstrasse, Matten, Interlaken, both of Switzerland

Filed Oct. 31, 1969, Ser. No. 872,904
Claims priority, application Switzerland, Nov. 5, 1968, 16485/68
Int. Cl. A63c *9/00*
U.S. Cl. 280—11.35 C **11 Claims**

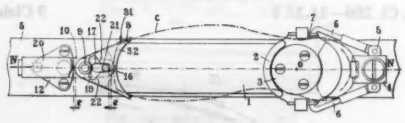


A ski binding is combined with one or several discs of plastic material inserted between the sole of the ski boot and the ski boot supporting surface of the ski. The discs are provided with diametrical bores through which a cable is passed which extends longitudinally of the ski between the boot and the ski surface. The cable passes through guides secured to the ski at both ends of the ski boot and is extended to form a loop about the upper of the boot. In a modification, one end of the cable is attached to the ski adjacent one end of the boot and the other end is attached to the ski boot.

3,647,235
SAFETY SKI BINDING

Jean Joseph Alfred Beyl, Boulevard Victor-Hugo, Nevers (Nievre), France

Filed Nov. 21, 1969, Ser. No. 878,864
Claims priority, application France, Dec. 4, 1968, 176496
Int. Cl. A63c *9/00*
U.S. Cl. 280—11.35 T **14 Claims**

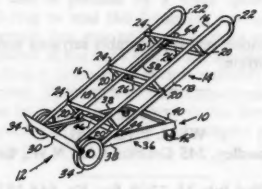


Safety ski binding comprising a movable plate adapted to pivot laterally on the ski and to receive the sole of a ski boot, a front jaw pivotally mounted on the front end of said movable plate about a pivot pin extending at right angles thereto, said jaw being adapted to be engaged by the toe end of the ski boot, and a resilient return device mounted on the ski ahead of said movable plate and adapted to urge said movable plate to its normal position when it is pivotally moved away therefrom. Said movable plate held against any longitudinal movement can only pivot about a fixed perpendicular axis and said return device acts upon the front jaw in such a manner that said front jaw is held in its normal position in relation to said movable plate when said movable plate is pivoted, but it is released therefrom only when the pivotal movement of said plate exceeds a predetermined angle.

3,647,236
HANDTRUCK ATTACHMENT

Leonard L. Hayes, 5060 Mitchell St., Riverside, Calif.

Filed Mar. 9, 1970, Ser. No. 18,405
Int. Cl. B62b *1/08*
U.S. Cl. 280—41 R **7 Claims**

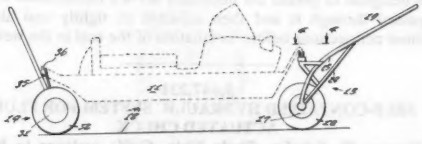


A handtruck body has a front end mounted on an axle and a pair of wheels about which the body is tilted for handling a load. An attachment has a front end pivotally connectable to the axle, a wheeled rear end and transversely slideable members having upstanding projections. The attachment is adapted to fit wholly within the body and be retained therein, yet can be released to swing downwardly and the projections can be foot manipulated for sliding the members laterally for engagement under the body to support it in tilted position.

3,647,237
SNOWMOBILE DOLLIES

Floyd W. Milton, Route 2, Box 197, Grand Rapids, Minn.

Filed Nov. 6, 1968, Ser. No. 773,777
Int. Cl. B62b *1/26*
U.S. Cl. 280—47.24 **1 Claim**



A front and rear dolly over which the front and rear end of a snowmobile can be placed so that the snowmobile may be transported conveniently to a place of use, each dolly including a frame supported upon a pair of wheels, each frame being adapted for receiving the snowmobile, and each dolly including a handle.

3,647,238
HANDTRUCK

Charles L. Mackey, Boynton Beach, Fla., assignor to Trio Machine and Manufacturing Company, Inc., Willoughby, Ohio

Filed Dec. 15, 1969, Ser. No. 884,964
Int. Cl. B62b *1/12*
U.S. Cl. 280—47.29 **1 Claim**

The disclosure hereof is of a handtruck which includes a load support mounted on a wheel and axle assembly, with a handle unit likewise connected to said wheel and axle assembly, both pivotally related, and means to interconnect the said support and handle unit for simultaneous movement, in various adjusted positions so that the handtruck and its load

may be manipulated either to maintain the load support at a generally level attitude, or to change the same depending

upon the type of load to be carried thereon, the adjustment being effected by simple means which are manipulatable from the handle unit as may be necessary or desirable.

3,647,239

VEHICLE SUSPENSION MECHANISM

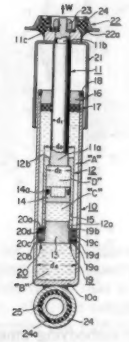
Teiji Katsumori, Yokohama, Japan, assignor to Tokico Limited, Kanagawa-ken, Japan

Filed July 15, 1970, Ser. No. 54,947

Claims priority, application Japan, July 17, 1969, 44/56683; 44/56684; July 25, 1969, 44/59241; 44/59242

Int. Cl. B60g *11/26*

U.S. Cl. 280—124 F **4 Claims**



The suspension strut of the monotube-type for use with a powered and wheeled vehicle is of the combined hydraulic and pneumatic type having a cylinder and a piston slidable therein and the interior space of said cylinder is filled with a hydraulic liquid such as oil. The piston is fitted with flow-restricting valve means for generating damping forces during telescopic relative movement of said piston to said cylinder and said piston is mechanically connected with the chassis or running gear of said vehicle which said cylinder is fixed to the other portion of the vehicle. The improvement comprises a sleeve formed between said rod and said piston and a free piston is slidably mounted within the interior space of said sleeve for dividing said space into two variable volume chambers and a certain volume of a high-pressure inert gaseous medium is confined within one of said two chambers in a totally enclosed manner by rigid encircling walls for assuring the least possible leakage of the confined gaseous medium from said gas chamber.

3,647,240

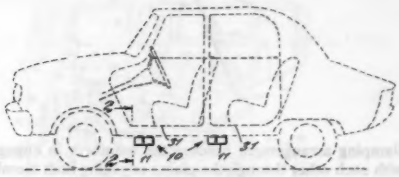
KICK BLOCK

Joseph Rachic, P. O. Box 109, Bessemer, Pa.

Filed Apr. 2, 1970, Ser. No. 25,006

Int. Cl. B62d *23/00*

U.S. Cl. 280—150 **3 Claims**



A shoe-kicking device for an automotive vehicle, the device comprising a wooden block mounted to a bracket, the bracket being mountable within a pair of clamps affixed to the chassis frame of an automotive vehicle so that the block in use, is in a position where a person may kick his feet upon entering the vehicle so to remove snow or slush from his shoes.

3,647,241

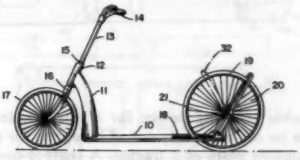
RIDER-PROPELLED VEHICLE

Phillip H. Huyssen, 116 Baber St., Hot Springs, Ark.

Filed Dec. 23, 1969, Ser. No. 887,595

Int. Cl. B62m *1/04*

U.S. Cl. 280—221 **3 Claims**



A rider-propelled vehicle has a footboard on which the rider may shift his weight in the propelling action and is provided at its front with a support and a handle-equipped steering shaft mounted in the support and with a fork receiving a front wheel. The rear portion of the board is slotted longitudinally to receive a rear wheel which is provided with an eccentric bearing. A shaft extending through the bearing is carried by support arms pivotally mounted upon the footboard, and a brace extends about the wheel and moves with the support arms.

3,647,242

ADJUSTABLE SUPPORT FOR KICKSTAND

Carlton P. Pawsat, and Robert F. Humlong, both of Maysville, Ky., assignors to Wald Manufacturing Company, Incorporated, Maysville, Ky.

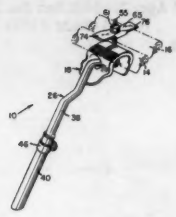
Continuation-in-part of application Ser. No. 853,786, Aug. 28, 1969, now abandoned. This application Jan. 9, 1970, Ser. No. 1,737

Int. Cl. B62h *1/02*

U.S. Cl. 280—298 **24 Claims**

A kickstand for a two-wheeled vehicle has its support adjustable in accordance with the size of the vehicle. The sup-

port comprises two telescoping members and a unique clamping arrangement holding the members in engagement with each other through the clamp engaging both members.

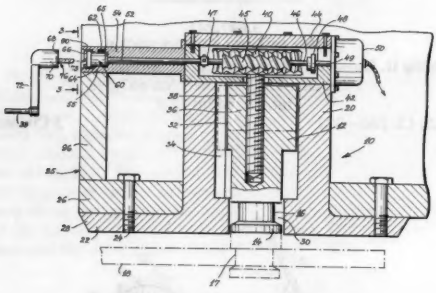


3,647,243

THEFTPROOF LOCKABLE COUPLING DEVICE

Charles E. Nagy, 3221 Benda Pl., Hollywood, Calif., and John F. Nagy, 785 West End Ave., New York, N.Y.

Filed Jan. 23, 1970, Ser. No. 5,268
Int. Cl. B62d *53/08*
U.S. Cl. 280—433 10 Claims



A lockable coupling device for a truck trailer has a pin which can be moved axially out of baseplate for engagement with a coupling plate of a tractor. A shaft is operatively arranged to advance and retract the pin. The shaft is joined to a barrel rotatable by a crank. The barrel can be locked against rotation by a lock in the barrel. The crank carries a key for locking and unlocking the barrel. A motor may be provided to drive the shaft for extending the pin. The pin may be arranged to obstruct a hole in a coupling plate attached to a truck trailer. The pin can be provided with a spring for automatic retraction when the shaft is retracted. The rotatable barrel may have switch contacts connected in circuit with the motor. The motor may be driven electrically or hydraulically.

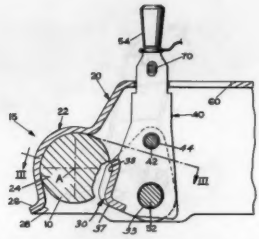
3,647,244

COUPLER FOR TRAILERS AND THE LIKE

Russell E. Hollis, Jr., Xenia, Ohio, assignor to General Processing Corporation, Crossville, Tenn.

Filed Jan. 12, 1970, Ser. No. 2,299
Int. Cl. B60d *1/06*
U.S. Cl. 280—512 9 Claims

A coupler for engaging ball-type hitches, having a movable jaw or tumbler controlled by a handle secured thereto such that both rotate about a common axis which is positioned below the center of the engaged ball and such that the jaw is rotatable upwardly and away from the ball to disengage the coupler therefrom. The jaw is positioned generally opposite a socket portion of the coupler housing to entrap the ball therebetween, and the housing defines a recess which receives said handle to lock the coupler in a ball-engaging condition, there being a spring which biases the handle toward such recess.

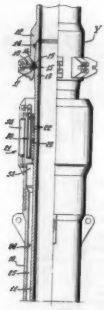


3,647,245

TELESCOPIC JOINT EMBODYING A PRESSURE-ACTUATED PACKING DEVICE

James W. E. Hanes, Ventura, and Edward Larralde, Santa Barbara, both of Calif., assignors to Vetco Offshore Industries, Inc., Ventura, Calif.

Filed Jan. 16, 1970, Ser. No. 3,400
Int. Cl. F16j *15/46*; F16l *17/00*
U.S. Cl. 285—106 20 Claims



A telescopic joint embodying inner and outer telescopic members, a packing device effecting a slidable seal between the members and composed of pliable packing material carried by the outer member and forced against the inner member by fluid pressure acting upon an elastic diaphragm or bladder surrounding the packing material and forcing the latter inwardly over substantially its full length against the inner member, the origin of the fluid pressure force being the interior of the telescopic joint.

3,647,246

TUBING COUPLING

Wilson A. Burtis, Westminster, Calif., assignor to DeLaval Turbine California, Inc., Princeton, N.J.

Filed Jan. 13, 1970, Ser. No. 2,470
Int. Cl. F16l *13/04*
U.S. Cl. 285—114 10 Claims

A coupling of either fixed or flexible structure for removably connecting the adjacent generally axially aligned ends of two lengths of tubing. The coupling whether of fixed or flexible structure includes a resilient tubular connector that effects primary surface to surface seals with flared end

portions of said tubing, and secondary seals by resilient rings that pressure contact said flared end portions, said connector, and ferrules that form a part of said coupling. Flexible cable or marcelled high-tensile strength wire removably engage slotted portions of the ferrules to prevent longitudinal separation thereof, and without axially loading the connector beyond that degree required to maintain said surface to surface seals.

3,647,247

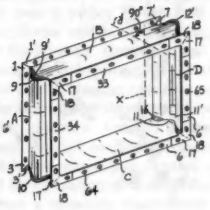
TUBULAR CONNECTOR FOR EXPANSION JOINTS

Frederick Bruce Pintard, Somerville, and George Michael Mollick, Middlesex, both of N.J., assignors to Johns-Manville Corporation, New York, N.Y.

Filed July 24, 1969, Ser. No. 844,478

Int. Cl. F16l *51/02*

U.S. Cl. 285—229 **8 Claims**



An expansion joint for joining adjacent ends of a pair of ducts wherein the expansion joint comprises a tubular connector having a turnable flange that is attached directly to the flange of each duct. Also, the tubular connector is made by a process which permits the folding thereof in sheetlike form.

3,647,248

KINGPIN LOCK AND INDICATOR FOR FIFTH WHEEL PLATE

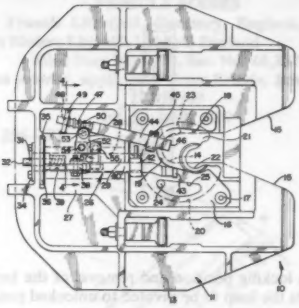
Ray L. Ferris, Thornton, and John H. Spence, Chicago Heights, both of Ill., assignors to Pullman Incorporated, Chicago, Ill.

Filed Sept. 24, 1970, Ser. No. 75,034

Int. Cl. F16d *9/00*

U.S. Cl. 287—20.5 R **5 Claims**

A fifth wheel plate for a trailer hitch includes a locking mechanism which is adapted to lock a kingpin receiving jaw in a closed position. The locking mechanism includes an indicating member which when the locking means is unlocked projects outwardly with respect to the fifth wheel plate so as to be readily visible. When the jaws are locked about a kingpin the indicator is recessed into the fifth wheel plate so that it is substantially removed from view. A rod is positioned in the path of the kingpin jaw during its movement to a closed position and engages the kingpin whereupon the actuating rod moves a latch mechanism out of the way of the locking mechanism so that it can move to its jaw locking position. If the kingpin is not within the jaw in proper position the latch mechanism prevents the locking mechanism from closing and



thus remains in the position indicating that proper locking has not been accomplished.

3,647,249

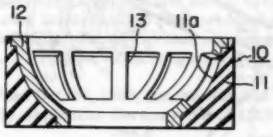
BALL JOINT

Takashi Baba, and Chikara Matsuoka, both of Aichi-ken, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota-shi, Aichi-ken, Japan

Continuation-in-part of application Ser. No. 760,849, Sept. 19, 1968, now abandoned. This application Sept. 14, 1970, Ser. No. 71,683

Int. Cl. F16c *11/06* **Ser. No. 71,683**

U.S. Cl. 287—90 R **3 Claims**



In a ball joint, the bearing for the ball or ball-like element comprises a support portion of a lubricant-resistant, elastically deformable rubberlike material having a surface layer formed to complement the ball-like member. The surface layer is of a wear- and lubricant-resistant synthetic resin having a low coefficient of friction, and is deformable in conformity with the underlying elastically deformable support portion. The surface layer has an opening or openings extending therethrough which serve as a reservoir for a lubricating oil and to moderate or impart flexibility to the surface layer.

3,647,250

PIVOTAL LOCKING CLASP

William M. Brown, 5175 North 105th St., Milwaukee, Wis.

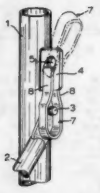
Filed Apr. 30, 1970, Ser. No. 33,356

Int. Cl. E05c *19/08*, *5/00*

U.S. Cl. 292—67 **3 Claims**

This invention is directed to pivotal locking clasps which may be employed to secure braces to posts as in scaffolds or to latch gates in closed position. The clasp consists of a baseplate having an aperture from which extends a slot. A hasp in the form of a loop is secured in a pivotal manner to the baseplate by a key located inside the aperture and

secured internally to the legs of the hasp. When the hasp is pivoted to register the key with the slot and lodge it therein, the clasp is in locking position and removal of the key from the slot permits the hasp to be pivoted to unlocked position.



3,647,251

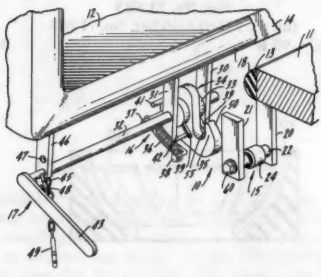
LATCHING MECHANISM

Fred Brown, Chicago, Ill., and James Henry Obermeyer, Newtown, Ind., assignors to Union Tank Car Company

Filed July 13, 1970, Ser. No. 54,275

Int. Cl. E05c *5/00, 19/12*

U.S. Cl. 292—111 **5 Claims**



A latching mechanism which comprises a latch pin, an operating rod parallel to the latch pin, an eccentric sleeve secured about the operating rod, a hook-shaped catch means rotatably secured about the eccentric sleeve, and spring means biasing the catch means such that as the catch means is moved against the latch pin the catch means automatically engages the latch pin. The eccentric sleeve is positioned such that upon rotation of the operating rod the catch means exerts a closing force on the latch pin.

3,647,252

GUIDE FOR FASTENERS

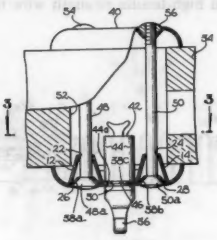
Roger J. Nolin, Monterey Park, and Anthony F. Brizzi, Santa Ana, both of Calif., assignors to Tool Research & Engineering Corporation, Beverly Hills, Calif.

Filed Apr. 3, 1970, Ser. No. 25,412

Int. Cl. E05b *15/00*

U.S. Cl. 292—357 **15 Claims**

A guide for properly aligning elongated fastening means which are used to join opposed parts separated by a substantial distance in an opening. A typical application for the invented screw guide is in a lock or latch assembly where the holding screws must generally pass through a substantial distance to join and engage opposed rosettes.



3,647,253

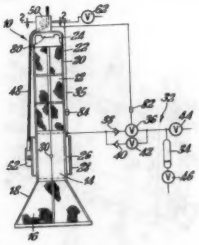
CAPTURE DEVICE

Frederic Lee Hettinger, Hollywood, Fla., and Bruce Calvin Gilman, Annandale, Va., assignors to Ocean Systems, Incorporated, New York, N.Y.

Filed Dec. 10, 1969, Ser. No. 883,921

Int. Cl. B66c *1/12*

U.S. Cl. 294—66 **7 Claims**



Apparatus for retrieving an experimental marine torpedo, or any other load, which is adapted to float on the surface of a body of water, comprising a main inflatable center section and a detachable nose and tail section. The nose section includes automatic signaling means responsive to the presence of the head of the torpedo for automatically inflating the center section. Additional means are incorporated to permit rotation of the apparatus from a vertical plane to a horizontal plane when retrieving the load.

3,647,254

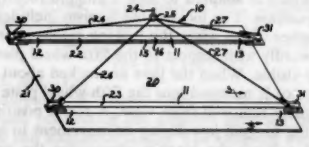
BEAM-LIFTING APPARATUS

Chester R. Munson, 3129 E. 34th, Spokane, Wash.

Filed July 30, 1970, Ser. No. 59,431

Int. Cl. B66c *1/34*

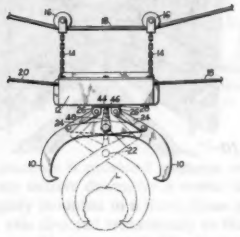
U.S. Cl. 294—78 **6 Claims**



A beam-lifting apparatus is described for lifting structural channel beams such as U, T, I, H or L-shaped beams utilizing

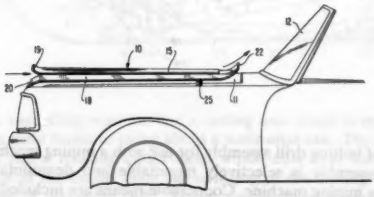
hook means mounted to the ends of cables for inserting on the ends of the beams. The hook means includes two arm elements spaced by a web slot for receiving the web of the beam therein with the arms extending along the side of the web underneath the beam flange.

3,647,255
REMOTE-CONTROLLED GRAPPLE
Gordon H. Hale, 13055 McKenzie Hwy., and James M. Fay, 890 Q St., both of Springfield, Oreg.
Filed Nov. 14, 1969, Ser. No. 876,740
Int. Cl. B66c *1/00*
U.S. Cl. 294—111 **6 Claims**



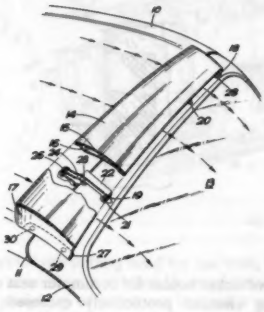
A pair of pivoted grapple hooks extend downward from a turntable mounted on a housing supported for movement between working sites. The turntable is driven by a hydraulic motor in the housing. One end of a cable is connected to the hooks and extends upward through a central opening in the turntable, thence over a pulley on the end of an extensible hydraulic piston-cylinder unit in the housing, and its opposite end is secured to the housing. Extension and retraction of the piston-cylinder unit effects opening and closing of the hooks. An electric motor in the housing receives power from a battery source in the housing to drive a hydraulic pump which supplies hydraulic pressure to the hydraulic motor and piston-cylinder unit through sequential operation of solenoid valves controlled by an electronic control circuit which, in turn, is activated by operation of a radio frequency receiver in the housing from a remotely transmitted radio frequency signal.

3,647,256
WINDSHIELD AIR DEFLECTOR
Ernest P. Cox, Seeley Lake, Mont.
Filed May 12, 1970, Ser. No. 36,590
Int. Cl. B60j *1/20*
U.S. Cl. 296—91 **3 Claims**



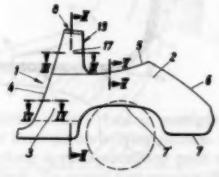
A unitary shallow airscoop attaches externally to the automobile hood and covers substantially the area of the hood and spans the width of the windshield. The airscoop is slightly tapered rearwardly to produce a nozzle effect and a deflector extension directs the airblast upwardly across the windshield to clear the same and to carry debris, insects and the like over the roof of the car. The device is formed of tough heat-resistant plastic and attaches to the hood in a safe manner without marring the automobile in any way.

3,647,257
VEHICLE BODIES
Edward Francis Litchfield, Coventry, England, assignor to Rootes Motors Limited, London, England
Filed May 25, 1970, Ser. No. 40,337
Claims priority, application Great Britain, June 3, 1970, 27,987/69
Int. Cl. B60j *1/20*
U.S. Cl. 296—91 **8 Claims**



A vehicle body has a rear access door in which a rear window is formed. An air vane is mounted on the body and door above the rear window to direct airflow over the window during forward movement of the vehicle.

3,647,258
PASSENGER CAR WITH A ROLL YOKE
Ferdinand Anton Ernst Porsche, Stuttgart-Nord, and Rainer Srock, Leinfelden, both of Germany, assignors to Firma Dr.-Ing. h.c.F. Porsche KG, Stuttgart-Zuffenhausen, Germany
Filed Oct. 24, 1969, Ser. No. 869,046
Claims priority, application Germany, Nov. 14, 1968, P 18 08 786.0
Int. Cl. B62d *25/06*
U.S. Cl. 296—102 **4 Claims**



An automotive vehicle, especially a passenger car, with sidewalls which are disposed beneath the belt line and consist of inner and outer pressed-out parts. The sidewalls are provided with extensions above the belt line and are integral with the sidewalls. These extensions form the upright sections of the roll yoke. In particular, the outer pressed-out parts are equipped with extensions which form the outer wall of the roll yoke. The inner pressed-out parts are provided with extensions forming the inner wall of the roll yoke. The roll yoke is thus constructed as a box girder and has an additional

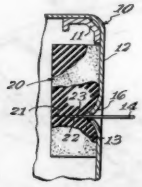
pressed-out reinforcing member with pressed-out portions arranged within the box girder and extending over the entire height of the roll yoke.

3,647,259

TAMPER-PROOF TICKET HOLDER FOR COMMUTER SEAT

Gordon W. Hultquist, Chicago, Ill., assignor to Coach and Car Equipment Corporation, Elk Grove Village, Ill.

Filed Aug. 19, 1970, Ser. No. 64,941
Int. Cl. A47c 7/62
U.S. Cl. 297—194 9 Claims



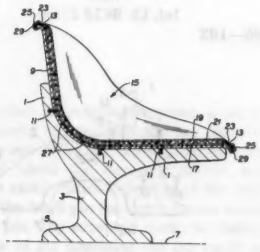
Tamper-proof ticket holder for commuter seat comprises a ticket-engaging element protectively enclosed within the backrest of the commuter seat, a slot in the rear wall of the commuter seat for receiving the ticket, and guide means for directing a ticket, inserted in the slot, toward the engaging element.

3,647,260

REPLACEABLE SEAT INSERT AND PROCESS OF MAKING

Bernard Carrington Grant, Sylvania, and John F. Reilly, Toledo, both of Ohio, assignors to The General Tire & Rubber Company

Filed Aug. 13, 1970, Ser. No. 63,371
Int. Cl. A47c 27/16, 3/00
U.S. Cl. 297—219 11 Claims



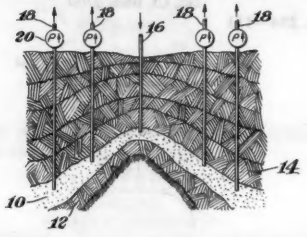
This invention concerns a replaceable insert for flare-edged, fully supported type chairs that combines the features of a rigid yet flexible base, a cushion, a nonwrinkling, non-tearable cover, and resilient edge clamping means in one integral unit and to a novel method of making the insert. This seat insert is characterized by low manufacture and material costs as well as the absence of metal fasteners and other adjustable implements thus eliminating special installation skills and tools.

3,647,261

PROCESS FOR SOLUTION MINING OF SILVER

Vernon A. Stenger, and Walter R. Kramer, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 4, 1970, Ser. No. 34,419
Int. Cl. E21b 43/28
U.S. Cl. 299—4 8 Claims



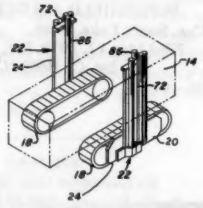
Disclosed herein is a process for the in situ leaching of noble metal values from ores. The process comprises feeding into a subterranean stratum chlorinated aqueous brine having an oxidation potential of at least about 500 millivolts. Noble metal values are solubilized into the brine which is then recovered from the stratum. The process is relatively efficient and economical and can be performed without complex, time-consuming excavations or the accumulation of processed tailings.

3,647,262

ROOF BOLTING METHOD AND ASSEMBLY

Charles W. Kacmarcy, P.O. Box 262, Franklin, Pa.

Continuation of application Ser. No. 777,313, Nov. 20, 1968, now abandoned. This application Jan. 7, 1970, Ser. No. 1,530
Int. Cl. E21c 11/02
U.S. Cl. 299—11 15 Claims

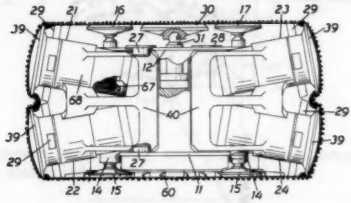


A roof bolting drill assembly for use with a mining machine which assembly is selectively mountable and demountably from the mining machine. Cooperable means are included on the mining machine and roof bolting assembly whereby the assembly is clamped to the mining machines for only linear motion for repositioning and unclamped from the mining machine during a bolting operation to permit limited relative traverse motion of the mining machine for simultaneous mining. A method of utilizing the above structure to carry out a simultaneous mining and roof bolting operation is also disclosed.

3,647,263
TUNNELLING MACHINES AND THE LIKE

Ernst Abraham Lauber, and Lorne Robert Herron, both of Thun, Switzerland, assignors to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Mar. 19, 1970, Ser. No. 21,167
Int. Cl. E21c 29/02; E01g 3/04
U.S. Cl. 299—31 11 Claims

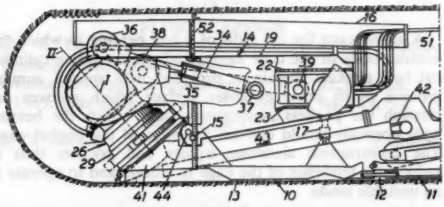


A tunneling machine is provided with one or more cutter heads with rotary cutters driven by a motor in each cutter head and swingably mounted in a front frame portion of the machine on an axis directed transversely to the longitudinal direction of the machine or tunnel. The front frame portion has supporting wall engaging shoes capable of being pressed against the tunnel walls for holding the front frame portion in fixed position and to loosen the grip in the walls when the front frame portion is fed forward or swung in any direction for steering purposes. The swinging axes of the cutter heads are offset from the axes along which the shoes press against the walls to facilitate service and supervision of the cutter heads.

3,647,264
MACHINE FOR DRIVING TUNNELS, DRIFTS, RAISES, AND THE LIKE

Ernst Abraham Lauber, Thun, Switzerland, assignor to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Apr. 14, 1970, Ser. No. 28,343
Int. Cl. E21c 29/02; E01g 3/04
U.S. Cl. 299—31 21 Claims

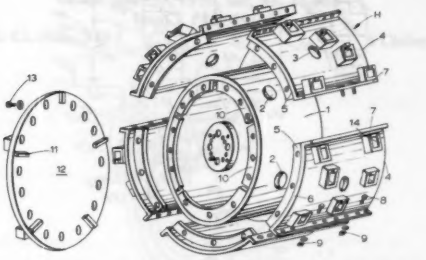


A tunnelling machine has a cutting unit which is mounted on a main frame to swing about a horizontal axis. The cutting unit has a rotating cutter head which cuts over the whole width of the tunnel upon the swinging of the cutting unit by means of two swing jacks. The cutting unit and the frame are braced between the sidewalls of the tunnel by means of two jacks which have their extension axes colinear with the horizontal axis of swinging. A transverse frame, slidable forwards and backwards in the main frame, can also be braced between the sidewalls by means of two colinear jacks. One of the swing jacks is mounted in the main frame and the other in the transverse frame, and the swing jacks are also used for advancing the machine in steps.

3,647,265
CUTTING HEADS

Gerald R. O. Pentith, Winston, Nr. Darlington, England, assignor to Greenside Machine Company, Limited, Durham, England

Filed July 31, 1970, Ser. No. 60,076
Int. Cl. E21c 25/10
U.S. Cl. 299—90 7 Claims

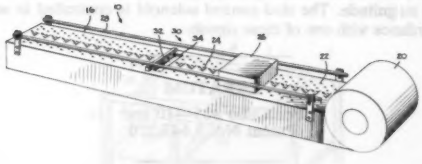


A rotary drum-type cutting head for use with, for example, mining and tunnelling machines, comprises a cylindrical drum to the periphery of which are secured a number of arcuate segments provided with pick boxes for the reception of picks.

3,647,266
VELOCITY CONTROL SYSTEM FOR AIR CONVEYORS

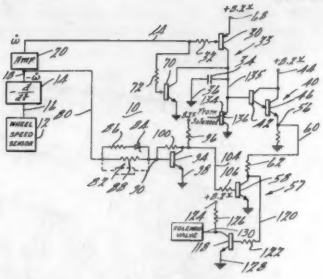
Stanley E. Hurd, Sunnyvale, and Leong Q. Fong, San Jose, both of Calif., assignors to Bangor Punta Operations, Inc., Greenwich, Conn.

Filed Jan. 8, 1971, Ser. No. 104,869
Int. Cl. B65g 54/04
U.S. Cl. 302—31 14 Claims



The system includes a deck having multiple openings for communicating air from an underlying plenum to lift and advance an object along a predetermined path spaced above and adjacent the deck. To retard fast moving objects without affecting slower moving objects, a barrier is disposed in the path of movement of the objects. Enlarged openings are provided through the deck directly upstream of the barrier to provide a lifting airjet of increased capacity. The fast moving objects have sufficient forward momentum to penetrate the larger capacity lifting airjet and strike the barrier. The larger capacity airjet lifts the stopped object over the barrier whereupon the object again starts moving downstream. The slower moving objects are lifted by the larger capacity airjet to an elevation above the barrier prior to hitting the barrier and are thus conveyed over the barrier without significant loss of velocity.

3,647,267
SKID CONTROL SYSTEM
Ronald S. Scharlack, San Antonio, Tex., assignor to Kelsey-Hayes Company, Romulus, Mich.
Filed Nov. 12, 1969, Ser. No. 875,993
Int. Cl. B60t *8/08, 8/12*
U.S. Cl. 303—21 P **10 Claims**



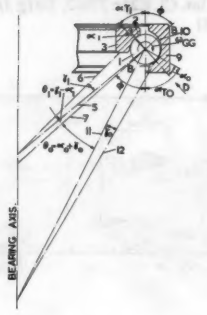
A system for controlling the braking of a wheeled vehicle to prevent skidding, in which the braking effect applied to the wheel is effectively responsive to one or a combination of two conditions, either a large spin-up rate of the wheel, or a small wheel speed versus car speed deviation, in this latter case it being assumed that the car speed remains essentially constant. The system generates a signal which is an approximation of the function representative of the time remaining to effectively reapply the brakes in order to anticipate the hydraulic and mechanical inertia of the system in reapplying the brake pressure to the wheels. The system includes a apparatus for sensing the wheel angular velocity, a differentiater circuit for differentiating the wheel velocity to achieve an angular acceleration signal, this acceleration signal being stored in the system for use in generating a wheel speed deviation from vehicle speed signal, and a system for sensing the rate of change of the wheel speed velocity relative to the car velocity or wheel speed deviation from vehicle speed and a second circuit for sensing the rate of spin-up of the wheel, this latter circuit including a function generator system, in the form of a nonlinear device, to vary the effect of the wheel spin-up signal rate in accordance with its magnitude. The skid control solenoid is controlled in accordance with one of these signals.

ERRATUM

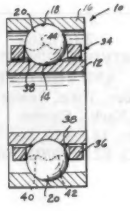
For Class 305—10 see:
Patent No. 3,647,270

3,647,268
BALL BEARINGS
Derrick John Haines, Swansea, Wales, assignor to Minister of Technology in Her Britannic Majesty's Government of the United Kingdom and Northern Ireland, London, England
Filed Apr. 22, 1970, Ser. No. 30,892
Claims priority, application Great Britain, Apr. 22, 1969, 20,397/69
Int. Cl. F16c *33/00*
U.S. Cl. 308—193 **7 Claims**

An angular contact ball thrust bearing has its outer race formed in two parts each of which has an arcuate track, the centers of the arcs comprised in the tracks being offset, the profile of the race with which the balls make contact thus not constituting a continuous circular arc. In a substantially unloaded condition each ball makes peripheral contact with the outer race at a point on one track substantially diametrically opposite to a contact point on the inner race. Under operational loading conditions, resultant forces on the balls urge them into peripheral contact with a second point on the outer race on the other track. The two arcs may be of differing radii while the outer race may be in either one or two parts and may include a substantially continuous elliptic arc in place of the two circular arcs.



3,647,269
STABLE BEARING CAGE
Lewis W. McKee, Brookfield, Conn., assignor to The Barden Corporation, Danbury, Conn.
Filed May 15, 1970, Ser. No. 37,767
Int. Cl. F16c *33/38*
U.S. Cl. 308—201 **12 Claims**

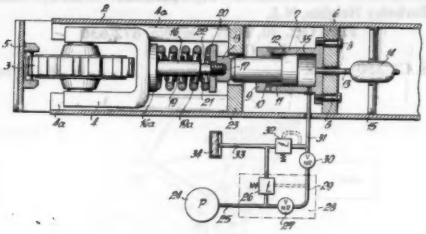


A stable cage for the balls of a ball bearing in which the annular body of the cage having radially extending cylindrical ball pockets therein is provided with spaced annular grooves in its inner or outer surface which grooves run through the pockets at locations along which the bearing balls normally would contact the edge of the pocket cage. The construction simulates square ball pockets thus to reduce the tendency of the cage to vibrate and to operate in an unstable mode.

3,647,270
HYDRAULIC CHAIN-TENSIONING DEVICE, ESPECIALLY FOR TRACKLAYING VEHICLES
Ernst Althaus, Dortmund-Kirchhorde, Germany, assignor to Orenstein & Koppel Aktiengesellschaft, Berlin, Germany
Filed Nov. 12, 1969, Ser. No. 875,870
Claims priority, application Germany, Nov. 13, 1968, P 18 08 528.4
Int. Cl. B62d *55/30*
U.S. Cl. 305—10 **6 Claims**

A hydraulic chain-tensioning device for tracklaying vehicles, in which the chain tension controlling wheel is carried by a reciprocable slide operable by a hydraulically operable cylinder-piston system in association with a fluid accumulator

through the intervention of a pushrod interposed between said cylinder piston system and said slide while yieldable



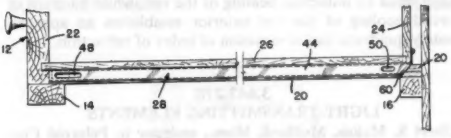
spring means surrounding said pushrod are interposed between said cylinder-piston means and said slide.

3,647,271

DRAWER GUIDE CONSTRUCTION

Bobby J. Allred, High Point, N.C., assignor to Allred Metal Stamping Works, Inc., High Point, N.C.

Filed Jan. 22, 1970, Ser. No. 4,910
Int. Cl. F16c *29/00*
U.S. Cl. 308—3.6 7 Claims



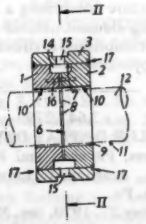
A channel member secured to the underside of a drawer cooperates with a T-shaped guide rail to prevent inadvertent removal of a drawer from a furniture frame. Protuberances on the laterally extending ears of the T-shaped rail cooperate with indentations on the opposed sidewalls of the channel member to limit displacement of the channel member relative to the rail.

3,647,272

FLUID BEARINGS

Colin W. Dee, Wimborne, England, assignor to Aerostatic Limited, Poole, Dorset, England

Continuation-in-part of application Ser. No. 792,220, Jan. 14, 1969. This application Nov. 7, 1969, Ser. No. 874,772
Int. Cl. F16c *17/16*
U.S. Cl. 308—9 5 Claims



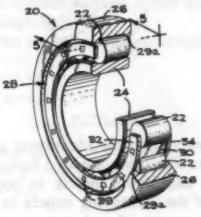
In a fluid journal bearing an outer bearing member has a first annular element with a radial face and a second annular element with a radial face which is butted up against the radial face of the first element, one or both of the radial faces being recessed axially at angular intervals such that a plurality of radial slots is defined by the abutting faces, an annular wrapper encircling the first and second elements and retaining them in coaxial abutted condition.

3,647,273

CYLINDRICAL ROLLER BEARING CAGE

Eugene E. Pfaffenberger, Indianapolis, Ind., assignor to FMC Corporation, San Jose, Calif.

Filed Mar. 23, 1970, Ser. No. 21,903
Int. Cl. F16c *19/10*
U.S. Cl. 308—217 6 Claims



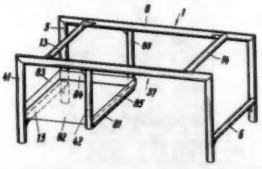
This invention relates to a cage for cylindrical roller bearings wherein each spacer between adjacent roller bearings have compound curved surfaces facing the cylinder surfaces of the roller.

3,647,274

TUBULAR FRAME FOR FURNITURE

Klaus Schnelle, Barmstedt/Holstein, Germany, assignor to VELOX-WERK Herbert Schnelle, Barmstedt/Holstein, Germany

Filed Oct. 15, 1969, Ser. No. 866,582
Claims priority, application Germany, May 31, 1969, P 19 27 580.0
Int. Cl. A47b *43/00, 47/00, 17/00*
U.S. Cl. 312—257 2 Claims



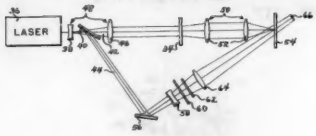
The invention relates to improvements in the construction of furniture with tubular frames of hollow profiles, and particularly hollow profiles with oblong, for example oval cross section, adapted to support planar elements, such as walls, plates and shelves. The invention has the object of facilitating the storage of the furniture in its dismantled state, its assembly by the user, and its stability. The furniture is assembled by means of plug-in connections without screws, by providing at least two subframes. The longer axis of the oblong profile is located in the plane of the subframe and retaining elements may be provided to increase the stability of the assembly. Provision is made for the arrangement of drawers, shelves and the like.

3,647,275

IDENTIFICATION SYSTEM USING REFERENCE BEAM CODED HOLOGRAMS

John H. Ward, Andover, Mass., assignor to Optronics International, Chelmsford, Mass.

Filed Sept. 9, 1970, Ser. No. 70,762
Int. Cl. G02b *27/00*
U.S. Cl. 350—3.5 **12 Claims**



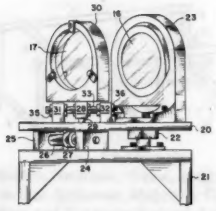
An identification system for identifying persons, articles, documents and the like using a coded hologram which contains the desired identifying indicia in coded holographic form. Encoding of the identifying indicia in the hologram is accomplished by means of a beam scrambler which introduces random path distances in either the reference or object beam during the formation of the hologram. The same or identical beam scrambler is used during reconstruction of the hologram to decode the identifying indicia. The identification system can be used for credit cards and personal access I.D. cards. Typical identifying indicia includes the user's name, signature, and photograph.

3,647,276

STAR IMAGE MOTION COMPENSATOR

William E. Howell, Yorktown, and Aaron J. Ostroff, Newport News, both of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration

Filed Apr. 28, 1970, Ser. No. 32,665
Int. Cl. G02b *23/02*
U.S. Cl. 350—16 **3 Claims**



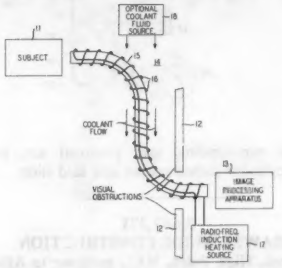
Technique and hardware internal to a telescope for maintaining one or more star images fixed on the focal plane of the telescope despite small motions between a guide star and the telescope. The hardware consists of first and second parallel mirrors that are maintained parallel to each other as they are rotated about an axis through the first mirror. Means are also provided that are responsive to the rotational movement for moving the second mirror relative to the first mirror to maintain the length of the light path from the first mirror to the focal plane constant.

3,647,277

INDUCTION HEATED OPTICAL GUIDE

Ivan P. Kaminow, New Shrewsbury, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Oct. 30, 1969, Ser. No. 872,630
Int. Cl. G02b *5/14*
U.S. Cl. 350—96 R **8 Claims**



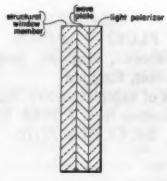
The disclosed optical guiding system employs radial thermal gradients in a propagation medium which is a bulk solid dielectric having a positive temperature coefficient of index of refraction and in which the radial thermal gradient is established by inductive heating of the rod, while inherent or forced cooling of the rod exterior establishes an approximately quadratic radial variation of index of refraction.

3,647,278

LIGHT-TRANSMITTING ELEMENTS

Albert S. Makas, Medford, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of application Ser. No. 771,970, Oct. 30, 1968, now Patent No. 3,528,722, which is a continuation-in-part of application Ser. No. 697,113, Jan. 11, 1968, now abandoned. This application Mar. 26, 1970, Ser. No. 22,863
Int. Cl. G02b *5/30*
U.S. Cl. 350—157 **10 Claims**



A composite structure comprising a high-order wave plate and a light-polarizing element utilized in a light-transmitting window apparatus comprising a stressed plastic material to eliminate polariscopy.

3,647,279

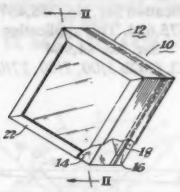
COLOR DISPLAY DEVICES

Edward N. Sharpless, Pitcairn, and Frederick Davis, Penn Hills, both of Pa., assignors to Liquid Crystal Industries, Inc., Turtle Creek, Pa.

Filed May 27, 1970, Ser. No. 40,925
Int. Cl. G02f *1/40*
U.S. Cl. 350—160 **20 Claims**

A display device for exhibiting a color pattern, said device comprising container means having a light-transmitting sec-

tion and a juxtaposed darker hued or opaque section, a quantity of liquid crystalline material interposed between said container sections and encapsulated within said container means, said material having a characteristic of selective light



scattering to exhibit color patterns within a range of temperatures at which said display device is normally utilized, and means for peripherally sealing one of said container sections to the other. Means can also be provided for applying deformational stress to the liquid crystal to vary its color pattern.

3,647,280

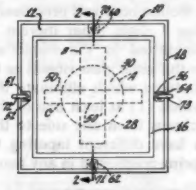
LIQUID CRYSTAL DISPLAY DEVICE

Richard Ira Klein, Edison, and Sandor Caplan, Trenton, both of N.J., assignors to RCA Corporation

Filed Nov. 6, 1969, Ser. No. 874,441

Int. Cl. G02f 1/28

U.S. Cl. 350—160 R **7 Claims**



Front and rear substrates sandwich a liquid crystal material therebetween. The substrates are transparent, and each substrate has a layer of a conductive material on the inside surface thereof. A thin opening or line divides the conductive material layers into segments, at least one of the segments of each layer defining an image, the images of the two layers being different. A layer of dielectric material covers one of the conductive layers and has an opening therethrough defining a third image. Terminal means are provided for applying either fluctuating or DC voltages to various ones of the conductive layer segments.

3,647,281

TELEPHOTOGRAPHIC OBJECTIVE HAVING SIX LENSES FORMING FOUR LENS GROUPS

Yoshitsugi Ikeda, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Shibuya-ku, Japan

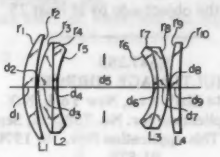
Filed Aug. 3, 1970, Ser. No. 60,670

Claims priority, application Japan, Aug. 27, 1969, 44/67825

Int. Cl. G02b 9/42

U.S. Cl. 350—222 **4 Claims**

Telephotographic objective of a wide angle of field consisting of six lens elements forming four lens groups separated from each other by airgaps, respectively. The foremost first lens group at the object side is a positive meniscus lens element, each of the second and the third lens group consisting of a composite negative lens group having a positive and a negative lens element cemented to each other with the negative lens element in each group facing to each other, the fourth lens group being a positive meniscus lens element. The concave surfaces of the first to three lens groups are directed



to a diaphragm located between the second and third lens groups while the convex surface of the fourth lens group is directed to the diaphragm.

The lens satisfies the following relationships:

(I) $0.7f_2 > f > -0.7f_3$

(II) $0.15f < d_5 < 0.35f$

(III) $(\nu_2-\nu_3)/(\nu_4-\nu_5) > 0.5$

$\nu_4-\nu_5 \geq 20$

(IV) (a) $(n_3-n_2)/|r_4| < 0.05, n_3 > n_2$

(b) $0.15f < -r_7 < 0.5f$

(V) $r_{10} > 1.5r_9 > 0.5f$

where:

f = focal length of the entire system

f_i (i=1, 2 —) = focal length of the respective lens group

d_i (i=1, 2 —) = thickness of each lens element or airgap

ν_i (i=1, 2 —) = Abbe's number of each lens element

n_i (i=1, 2 —) = refractive index of each lens element

r_i (i=1, 2 —) = radius of curvature of the respective surface of each lens element.

3,647,282

A WIDE ANGLE FLAT FIELD MICROSCOPIC OBJECTIVE OF LOW POWER

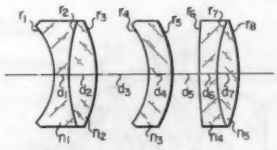
Akio Taira, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed July 23, 1970, Ser. No. 58,452

Claims priority, application Japan, Aug. 14, 1969, 44/64374

Int. Cl. G02b 9/12, 21/02

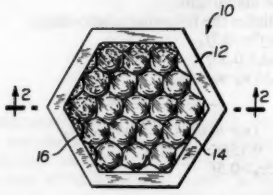
U.S. Cl. 350—225 **1 Claim**



Microscopic objective lens consisting of a first, a second and a third lens group arranged in that order from the object side and separated respectively by airgaps from each other. The first lens group is constructed by a cemented meniscus lens component with the air contacting surfaces thereof concave toward the object side and the second lens group is constructed by a meniscus lens element with the surfaces thereof concave toward the object side while the third lens group is constructed by a cemented lens component consisting of a lens element of negative refractive power arranged at the object side and a lens element of positive refractive power arranged at the image side. The absolute value of the focal length of the second lens group is selected to be greater than the focal length of the entire system and the absolute value of the radius of curvature of the surface of the second lens group at the object side is selected to be smaller than half the focal length of the entire system while the absolute value of

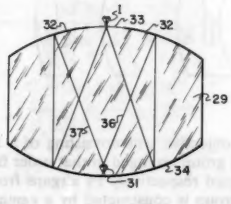
the radius of curvature of the air contacting surface of the first lens group at the object side is selected to be greater than 0.15 times the focal length of the entire system and the Abbe's number of the lens element of the third lens group at the image side thereof is selected to be greater than that of the lens element at the object side by at least 25.

3,647,283
MULTIIMAGE MIRROR
George Castanis, 444 Sixth Ave., New York, N.Y.
Continuation of application Ser. No. 758,736, Sept. 10, 1968, now abandoned. This application Nov. 16, 1970, Ser. No. 91,578
Int. Cl. G02b *5/10*
U.S. Cl. 350—293 **8 Claims**



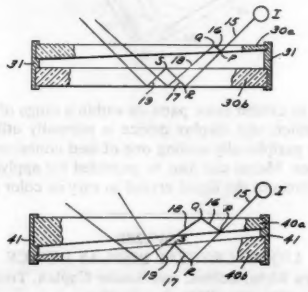
A mirror for producing a multiplicity of similar images, has a multiplicity of convex reflective faces disposed in an overall concave or dish-shaped array. The convex faces and the overall dish shape are preferably portions of spheres, with the radius of curvature of the overall dish shape being desirably from about 12 to 1/8 times that of the faces. The faces may have outlines of various shapes, e.g., hexagonal, circular, etc. A planar or slightly concave surface may be disposed in the array, as in the center thereof, to provide a conventional vanity or shaving mirror portion.

3,647,284
OPTICAL DISPLAY DEVICE
Virgil B. Elings, 958 Isleta, and Caliste J. Landry, Clingstone Painted Cave, Star Route, both of Santa Barbara, Calif.
Filed Nov. 30, 1970, Ser. No. 93,608
Int. Cl. G02b *17/06*
U.S. Cl. 350—294 **6 Claims**



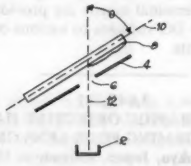
A pair of concave mirrors are placed with their concave sides toward each other and one is optically apertured, either with a hole in the mirror or by an unsilvered portion in a mirror of transparent material. An object placed at the mirror that is not apertured will project a real image at the region of the aperture if the curvature and spacings of the mirrors are correct. The image may be left-right reversed or may have the same orientation as the object depending upon the reflective paths of rays from the object. The image may be magnified or reduced in size depending upon curvatures and spacings of the mirrors.

3,647,285
GLASS WINDOW STRUCTURES ELIMINATING JAMIN INTERFERENCE FRINGES
James E. Harvey, Tucson, Ariz.; Max J. Irland, Dearborn, and Victor L. Lindberg, Northville, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.
Continuation of application Ser. No. 756,437, Aug. 30, 1968, now Patent No. 3,575,694. This application June 10, 1970, Ser. No. 44,964
Int. Cl. G02b *5/00, 7/00, 27/00*
U.S. Cl. 350—319 **6 Claims**



A glass window structure which eliminates Jamin interference fringes includes a frame for supporting a pair of glass brackets in spaced relationship. A first glass bracket is supported in the frame and this bracket is cut from a glass ribbon manufactured in a process wherein molten glass is flowed out upon a molten bath and processed thereon so that the glass ribbon has a slight taper therein. A second glass bracket is also supported in the frame and this second bracket is cut from the same glass ribbon as the first bracket. Other window structures which eliminate the Jamin fringes are structures in which (1) at least one of the glass brackets has a tapering thickness from one side to the other side, or (2) both brackets have different tapering thicknesses with the thicker edges being positioned in any manner.

3,647,286
REPRODUCTION APPARATUS USING PHOTOVOLTAIC MATERIAL
John H. Delorme, Jr., 6826 North Wayne, Chicago, Ill.
Filed Feb. 10, 1969, Ser. No. 797,729
Int. Cl. G03g *13/00*
U.S. Cl. 355—17 **2 Claims**



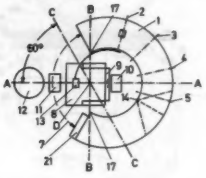
Apparatus for the reproduction of visual images which uses a layer of photovoltaic material deposited on a substrate in such a way as to substantially increase the voltage produced when exposed to light according the pattern of an image to be reproduced so that no external charging voltage is required. The application of a toner to the material develops the image which may then be transferred to a copy sheet to reproduce the image. After discharge, either naturally by the passage of time or intentionally, the material may be exposed once again to permit the reproduction of a new image.

3,647,287

APPLIANCE FOR DIAGNOSIS AND THERAPEUTIC EYE TREATMENT

Herbert Schwind, Dammer Weg 37, 8752 Goldbach-Aschaffenburg, Germany

Filed Mar. 10, 1970, Ser. No. 18,161
Claims priority, application Germany, Sept. 20, 1969, P 19 47 803.6
Int. Cl. A61b *3/00*; A47b *11/00*
U.S. Cl. 351—38 5 Claims



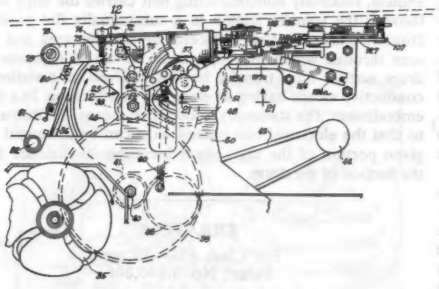
An appliance for ophthalmologists, comprising a movable ring-sector shaped work surface for holding ophthalmic instruments, that subtends an angle of approximately 240° and closely surrounds the patient's chair.

3,647,288

AUTOMATIC STOPPING MECHANISM FOR A MOTION PICTURE PROJECTOR

George J. Zahradnik, Wheaton, and Arthur A. Pudark, Evanston, both of Ill., assignors to A. B. Dick Company, Niles, Ill.

Filed July 31, 1970, Ser. No. 59,933
Int. Cl. G03b *1/00*
U.S. Cl. 352—174 14 Claims



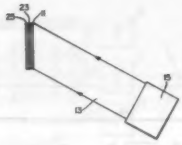
A solenoid is energized either by an 80 Hz. signal on the film sound track or by operation of a button on the projector. The solenoid operates a lever which releases a crank arm and allows a cam follower on the latter to engage a spiral cam track on a timing wheel which is rotated by the shutter. Such movement on of the lever also operates switch contacts to deenergize the projector motor and to connect the projection lamp in a dimming circuit. The motor and the means driven thereby including the timing wheel coast as the latter moves the crank arm which in turn moves a stop block into the path of movement of a lug on the shutter thereby to stop the latter in an open position. A manually operated start mechanism simultaneously disengages the stop member from the shutter lug, energizes the projector motor and disconnects the projection lamp from the dimming circuit.

3,647,289

APPARATUS AND METHOD FOR HOLOGRAM COPYING WITH REFERENCE BEAM INTENSITY CONTROL

Bob L. Weber, Columbus, Ohio, assignor to Holotron Corporation, Wilmington, Del.

Filed Mar. 28, 1969, Ser. No. 811,384
Int. Cl. G03b *27/00*
U.S. Cl. 355—2 18 Claims



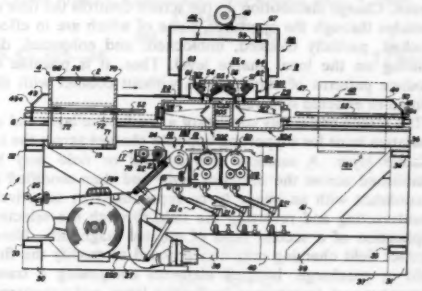
A technique for making a copy of an off-axis hologram wherein the hologram and a photosensitive copy detector are placed very close together with a means therebetween, for significantly attenuating that portion of a reconstructing light beam which is undiffracted by the hologram without significantly altering the intensity of an image carrying first order diffracted beam.

3,647,290

PHOTOELECTROPHORETIC IMAGING SYSTEM

Raymond K. Egnaczak, Williamson, and Gino F. Squassoni, Pittsford, both of N.Y., assignors to Xerox Corporation, Rochester, N.Y.

Filed Nov. 14, 1969, Ser. No. 876,983
Int. Cl. G03g *15/04*
U.S. Cl. 355—3 22 Claims

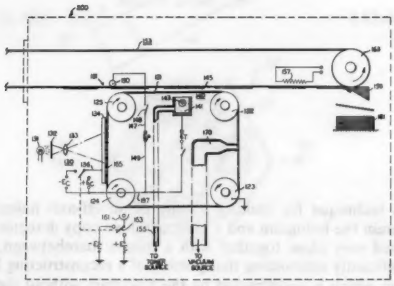


An imaging machine having a generally flat plate electrode on which images of opaque or transparency originals are formed from a photoelectrophoretic ink. The flat plate electrode travels along a generally linear path past various roller electrodes. At one roller electrode the photoelectrophoretic ink is applied to the flat plate electrode. At another roller electrode the ink is exposed to light and electric field. At yet another roller electrode, ink in imagewise configuration is transferred to an appropriate substrate.

3,647,291
APPARATUS FOR APERTURE CONTROLLED ELECTROSTATIC IMAGE REPRODUCTION OR CONSTITUTION

Gerald L. Pressman, San Jose, and Thomas D. Kittredge, South San Francisco, both of Calif., assignors to Electroprint, Inc., Palo Alto, Calif.

Filed Nov. 15, 1968, Ser. No. 776,146
Int. Cl. G03g 15/00
U.S. Cl. 355—3 38 Claims



The invention basically comprises apparatus and methods relating to the field of electrostatics, and is concerned with electrostatic reproducing or constituting. Apertured screen means carry charge distributions in accordance with a pattern such that particles directed at the screen means pass therethrough under modulation control dictated by the pattern.

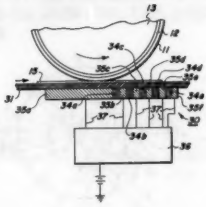
The invention further relates to apparatus and methods for constituting or reproducing images through the use of a multilayered screen consisting of an array of apertures. A propulsion field directs charged particles through the screen to a receiving medium preferably spaced at a distance from the screen. Charge distribution on the screen controls the flow of particles through the apertures, some of which are in effect blocked, partially blocked, unblocked, and enhanced, depending on the local charge level. Thus, it is possible to produce patterns of varying tone without contact with the printed or effected substrate.

The screen preferably consists of a conductive layer and an insulative layer for supporting opposite charges across the insulative layer. A uniform charge level or field may be established across the insulator layer and then modified in accordance with an image to be reproduced by selectively counteracting and reversing the field through the selective application of a second field of greater magnitude. Novel contact field charging may also be used to modify the first field or precharge. Imaging elements comprising a transparent support, transparent conductive layer, and transparent insulative layer secured together in that order are provided for contacting the screen to permit an applied voltage connected between the conductive layer of the imaging elements and the conductive layer of the screen to modify and even reverse the precharge level in accordance with image light shined through the image elements onto the screen. The screen insulator layer need not be photoconductive if the image elements include as the transparent insulative layer a photoconductive layer which need not be transparent. The imaging elements may be used with or without the enhancing field. Ions may comprise the particles to take advantage of the enhancing fields or used in conjunction with toner particles to cause printing on ordinary paper.

3,647,292
TRANSFER APPARATUS

Donald J. Weikel, Jr., Rochester, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Filed Nov. 28, 1969, Ser. No. 880,576
Int. Cl. G03g 15/00, 15/08
U.S. Cl. 355—3 7 Claims



An apparatus and method for efficiently transferring a toner image from a rotatable electrostatic drum to a copy sheet while the copy sheet remains in a substantially flat position without degrading the quality of the latent image on the drum by imposing an electrical field between the copy sheet and drum as the sheet moves away from the drum surface after the toner image has been transferred to the copy sheet. In one embodiment of the invention, a movable, endless, two-layer belt having an inner layer of conductive material and an outer layer of relatively nonconductive material carries the copy sheet through the transfer station in a plane substantially tangent to the surface of the drum. An electrical bias is applied to the inner layer of the belt which attracts toner from the electrostatic drum to the copy sheet, but charge is prevented from reaching the copy sheet and drum by the relatively nonconductive layer of the belt. Small holes can be made in the belt and a vacuum placed on the copy sheet through the holes to insure there is no relative motion between the copy sheet and belt during the transfer step.

In a second embodiment of the invention, a movable, endless, relatively nonconducting belt carries the copy sheet through the transfer station in a substantially flat position. Directly under the belt, adjacent the transfer area and that area through which the copy sheet travels as it leaves the drum surface after transfer has taken place, is a stationary conductive means having an electrical bias thereon. In a third embodiment, the stationary conductive means is constructed so that the electrical bias placed on it can be increased as a given portion of the copy sheet increases its distance from the surface of the drum.

ERRATUM

For Class 355—15 see:
Patent No. 3,646,866

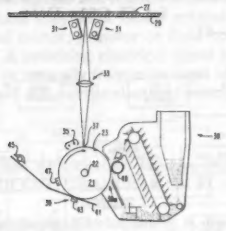
3,647,293
COPYING SYSTEM FEATURING COMBINED DEVELOPING-CLEANING STATION ALTERNATELY ACTIVATED

Carl A. Queener, Lexington, Ky., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 1, 1970, Ser. No. 94,037
Int. Cl. G03g 15/00
U.S. Cl. 355—15 8 Claims

Electrophotographic copying apparatus has charging, imaging, transferring, precleaning, and erasing facilities in a conventional sense but incorporates a combined developing-cleaning unit that is operable to perform either function at the proper time during the copying sequence. A first version incorporates a photoconductor drum structure surrounded with the necessary electrophotographic elements including a

single developer-cleaner unit. Another version incorporates a photoconductor belt movable forwardly and reversely. In either version, cleaning cycles may alternate with developing cycles or be activated following the production of a high number of images on the photoconductor surface. Conveniently, a magnetic brush element forms a contacting surface for conveying toner onto the photoconductor surface during developing and for scavenging residual toner from the photoconductor surface by bringing developer mixture into contact with the photoconductor surface during cleaning. Appropriate changes in biasing of the brush are made during operation.



3,647,294

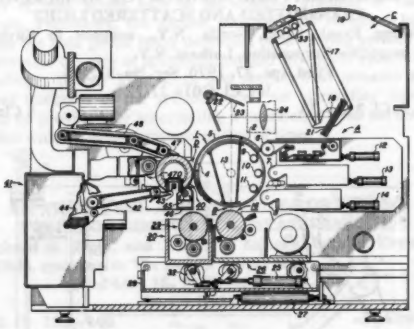
MATERIALS APPLICATION AND CLEANING APPARATUS FOR XEROGRAPHIC APPARATUS

Raymond K. Egnaczak, Williamson, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Filed Nov. 14, 1969, Ser. No. 876,923

Int. Cl. G03g *15/22*

U.S. Cl. 355—15 **10 Claims**



A modular imaging electrode transport assembly for use in forming photoelectrophoretic images in automated imaging machines. The unit has one tank for each roller electrode and electrical coupling means at each roller. A carriage shuttles the tanks back and forth past a contact position and each tank raises and holds the roller in the contact position while it functions in the imaging process so that the roller contacts an imaging member of the machine in which it is located in order to form a suspension image.

3,647,295

COLOR PRINTING APPARATUS

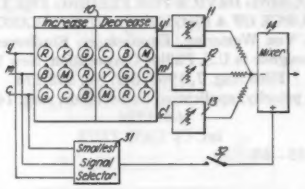
Mouayed Edouard Dobouney, Dartford, England, assignor to Crosfield Electronics Limited, London, England

Filed May 18, 1970, Ser. No. 38,328

Claims priority, application Great Britain, May 23, 1969, 26,508/69

Int. Cl. G03b *27/76*

U.S. Cl. 355—38 **6 Claims**



In the reproduction of a colored original red, green and blue filters are used in a photoelectric scanning operation to analyze the color components of the original and corresponding electric signals are generated. To prepare a color printer representing a color which is not complementary to any of the filter colors (for example brown) the primary signals derived by means of the filters are combined in a signal-processing circuit to form further electric signals representing more restricted color ranges. These further signals are used to modify the primary signals so that the modified primary signals are less responsive to those restricted color ranges which are not required for the special color printer. Some at least of the modified primary signals are then combined in a mixer circuit to give a resultant representing the required color printer.

3,647,296

LIGHT-MONITORING DEVICE FOR USE WITH COLOR PHOTOGRAPHIC APPARATUS

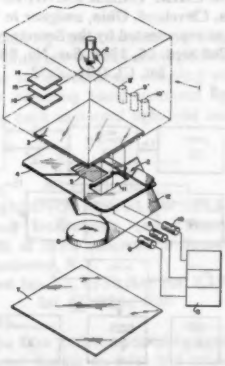
John Geoffrey Long, Surbiton, England, assignor to The Pavelle Corporation, New York, N.Y.

Filed Mar. 9, 1970, Ser. No. 17,586

Claims priority, application Great Britain, Mar. 7, 1969, 12,240/69

Int. Cl. G03b *27/76*

U.S. Cl. 355—38 **2 Claims**



Light-monitoring apparatus is disclosed for use with a color printing process in which the mean printing conditions are determined and applied to all prints. Three photoelectric transducers responsive to the primary colors are arranged to

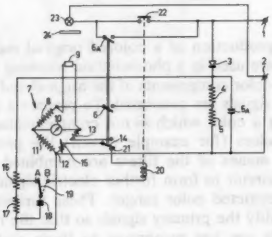
receive light from the source, after filtering, with such light being screened from the photosensitive material on which the prints are formed. The exposure times for the process are then determined by the average intensity of the light impinging upon the photocells. The photocells may also be partially responsive to light passing through the negative or transparency to correct partially for density and/or color changes from transparency to transparency.

3,647,297

SWITCHING DEVICE FOR FEEDING THE LIGHT SOURCE OF A PHOTOGRAPHIC ENLARGER

Peter Jan Van Westering, Emmasingel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 7, 1969, Ser. No. 848,176
Claims priority, application Netherlands, Aug. 14, 1968, 6811524
Int. Cl. G03b *27/78*
U.S. Cl. 355—68 **11 Claims**



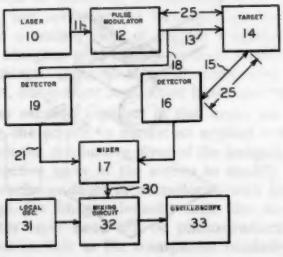
An automatic exposure control system that includes a photosensitive element in one arm of a bridge circuit and a first potentiometer connected in a second bridge arm via a first switch. A capacitor is connected to the supply source via a second potentiometer and a second switch. In the second operating position of the two switches, the capacitor forms a closed circuit with the first potentiometer and a relay coil. A contact of the relay controls the supply of electric energy to a light source for a photographic enlarger. A third switch coupled to the first switch is connected in shunt with the relay contact.

3,647,298

PULSE CHIRP LASER RANGING DEVICE

Jack A. Soules, Cleveland, Ohio, assignor to The United States of America as represented by the Secretary of the Navy

Filed Sept. 16, 1969, Ser. No. 858,477
Int. Cl. G01c *3/08*
U.S. Cl. 356—5 **5 Claims**



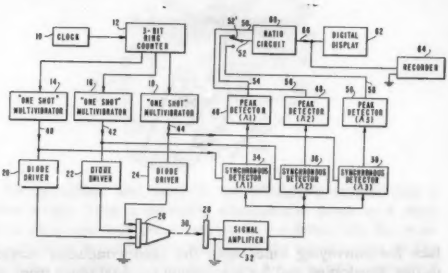
The invention disclosed in this application concerns itself with a laser echo ranging system utilizing a unique modulator for providing an audio signal corresponding to the distance to the target and a simplified inexpensive method of reading the distances.

3,647,299

OXIMETER

Robert G. Lavallee, Ashland, Mass., assignor to American Optical Corporation, Southbridge, Mass.

Filed Apr. 20, 1970, Ser. No. 29,851
Int. Cl. G01n *33/16*
U.S. Cl. 356—41 **12 Claims**



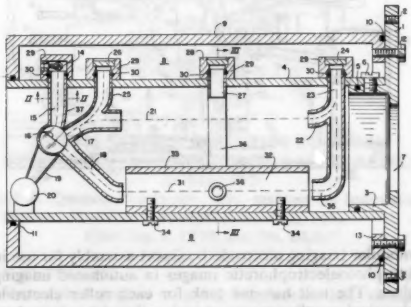
An oximeter having a single light-emitting diode structure capable of emitting the three wavelengths required for oximetry and dye dilution measurements. A ring counter causes three semiconductor chips in the device to be energized in sequence. Light is directed toward the blood sample and the reflected light is extended to three synchronous detectors. Each detector operates only when a corresponding semiconductor chip in the light-emitting diode is energized; each detector thus responds only to the intensity of light at a respective wavelength. The outputs of two of the detectors are extended to a ratio circuit for deriving a final measurement. The ratio circuit itself has a high accuracy over the relatively low dynamic range of the ratio values.

3,647,300

DUAL-BEAM FLUID MONITOR FOR MEASURING TRANSMITTED AND SCATTERED LIGHT

George Frank Skala, Scotia, N.Y., assignor to Environment/One Corporation, Latham, N.Y.

Filed Apr. 27, 1970, Ser. No. 31,995
Int. Cl. G01n *21/22*
U.S. Cl. 356—73 **5 Claims**



An optical system for determining the contamination, chemical breakdown, or other change in a fluid that manifests itself in a change in optical properties of the fluid with respect to attenuation or a scattering of a light beam,

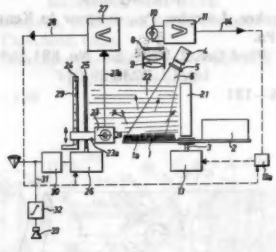
wherein the light from a single source is optically split to pass in parallel through a reference material and a sample material for recombining as an input to a transducer that produces a correlated electrical output signal. Switching means is provided in each of the parallel paths of the light to alternately feed a light pulse from the sample material and the light pulse from the reference material to the transducer. Additional electric switching means is provided to separate the correlated electrical signals produced by the transducer respectively for the sample and reference materials. The optical switching means may be a motor rotated or oscillated mirror, a vibrated mirror, a motor or fluid operated screen disc, or the like. A switching electrical signal is produced by magnetic coding or optically from movement of the mirror or a screen, which will actuate the electrical switching means.

3,647,301

SYSTEM FOR ASCERTAINING THE ACCUMULATION OF PULVERULENT, GRANULAR OR FLAKY BULK GOODS

Oskar Edwin Sturzinger, Kirchmattweg 6, Baar, Zug, Switzerland

Continuation-in-part of application Ser. No. 695,995, Jan. 5, 1968. This application Jan. 9, 1970, Ser. No. 1,636
Int. Cl. G01n *21/00, 21/48, 21/16*
U.S. Cl. 356—103 **10 Claims**



A system is provided for determining an accumulation per unit time and for determining a layer thickness of accumulation of bulk goods such as pulverulent, granular or flaky goods. Preferably, the system uses diffused reflected light from the bulk goods being deposited on a moving surface to determine the rate of accumulation and an optical system including a further light beam and photocell to measure the layer thickness of the accumulation. An integrating means may be provided for ascertaining a cumulative total accumulation within a predetermined period of time.

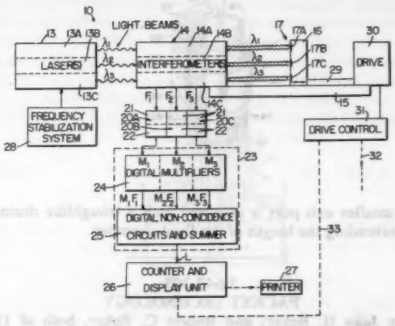
3,647,302

APPARATUS FOR AND METHOD OF OBTAINING PRECISION DIMENSIONAL MEASUREMENTS

Richard B. Zipin, and James T. Zalusky, both of Dayton, Ohio, assignors to The Bendix Corporation

Filed May 18, 1970, Ser. No. 38,372
Int. Cl. G01b *9/02*
U.S. Cl. 356—106 **20 Claims**

A plurality of beams of electromagnetic energy having different known wavelengths in a vacuum are each operatively associated with an interferometer having a movable reflector to provide an output fringe pattern for each beam characterized by alternating annulment and reenforcement fringes. The reflector is moved causing movement of the fringes of each beam past an associated detector which provides an electrical output signal in response to alternating ones of the fringes as they move therepast whereby the electrical output signals represent a count of alternate fringes of each beam. The electrical output signals from the detectors are scaled and summed to provide a combination signal which represents the actual distance moved by the reflector and



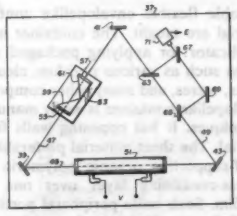
such distance has been inherently corrected for variations in ambient conditions.

3,647,303

RING LASER HAVING MEANS FOR PREVENTING MODE LOCKING

Charles J. Kramer, Jr., Fort Lee, N.J., assignor to The Bendix Corporation

Filed Sept. 5, 1969, Ser. No. 855,677
Int. Cl. G01b *9/02;* **H01s** *3/00*
U.S. Cl. 356—106 LR **14 Claims**



A ring laser having laser beams traveling in opposite directions and a polarizer for circularly polarizing the beams in the same sense to reduce beam coupling within the lasing medium and for rejecting back scattered light to prevent oscillation of the back scattered light and reduce beam interaction.

3,647,304

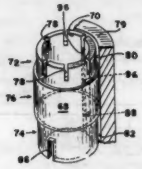
MICROVOLUME FLOW CELL

Henry J. Emmel, Irondequoit, and Thomas J. Morgan, Rochester, both of N.Y., assignors to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Jan. 12, 1970, Ser. No. 2,157
Int. Cl. G01n *1/10*
U.S. Cl. 356—246 **9 Claims**

A microvolume flow cell for providing laminar fluid flow comprises an insert having an inlet and an outlet and each defining a plurality of openings channeling to a generally cylindrical fluid chamber formed therein. The openings in the inlet end are elongated and equidistantly disposed about the periphery of the inlet for providing for a laminar fluid flow therethrough into the fluid chamber. The openings in

the outlet end comprise two diametrically disposed exit ports of differing size for fluid communication with a waste system.

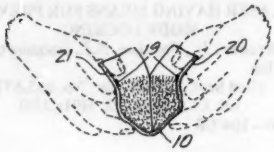


The smaller exit port is disposed with a troughlike drainage slot extending the length of the fluid chamber.

3,647,305
PACKET TECHNOLOGY

Mary Joan H. Baker, and Robert C. Baker, both of 1831 Summit Avenue, St. Paul, Minn.

Filed Mar. 13, 1969, Ser. No. 806,983
Int. Cl. A46b *5/04*
U.S. Cl. 401—7 **19 Claims**



A disposable flexible envelopelike container and a new sheet material are taught. The container is convertible to a pocket applicator for applying packaged messy spreadable compositions such as various polishes, cleaners, pastes, oils, paints, stains, waxes, and many other compositions.

The envelopelike container is easily manufactured by automated techniques. It has opposing walls formed of flexible sheet material. The sheet material preferably employed has a flexible self-supporting organic polymeric film and an exposed recess-containing layer over one surface of that polymeric film. Seals unite peripheral portions of the opposing walls of the envelope together. One edge is only temporarily sealed; and the others are permanently united. Earflaps extend beyond the temporary seal.

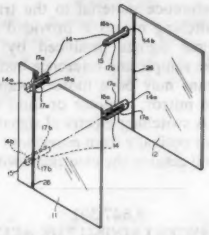
In use, a person grips the earflaps and pulls them apart to rupture the temporary seal and thereby convert the envelopelike container into a pocket. This pocket is then reversed or inverted to place the spreadable composition exterior to the inverted pocket. One then inserts one's fingers in the inverted pocket, which now becomes an applicator, and then applies the spreadable composition. The earflaps serve as a shield against unwanted contact with the spreadable composition during application of it to a surface. The length of the temporary seal and its relationship to the depth of the envelope cavity is critical to permit convenient reversal or inversion of the pocket during the step of converting the container into an applicator.

3,647,306
BINDING POST CONSTRUCTION

John H. Chamberlin, 5070 West Lake Road, Cazenovia, N.Y.

Filed Mar. 4, 1970, Ser. No. 16,362
Int. Cl. B42f *3/04, 13/12*
U.S. Cl. 402—48 **6 Claims**

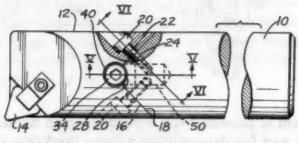
A post construction for looseleaf binders in which the post is comprised of two interengaging complementary parts, one for each cover. The two post parts are expanded by interior means to force them into tight engagement with the wall of a bore through the paper block and this operates to lock the binder. The post with its two parts assembled is generally tubular, and each part is made up of one or more sector shaped pieces of the tubular wall. The binding post parts can be formed integrally with their respective covers or they can be independent elements separate from the covers.



3,647,307
BORING BAR

Leon G. Kosker, Latrobe, Pa., assignor to Kennametal Inc., Latrobe, Pa.

Filed Dec. 2, 1969, Ser. No. 881,569
Int. Cl. B23b *29/034*
U.S. Cl. 408—181 **5 Claims**



The invention relates to a boring bar made up of a shank or bar member and a head member mounted on the outer end thereof and adapted for detachably supporting a cutting insert. The head member is adjustable on the bar member in a direction substantially perpendicular to the top surface of the cutting insert over which chips flow during a cutting operation.

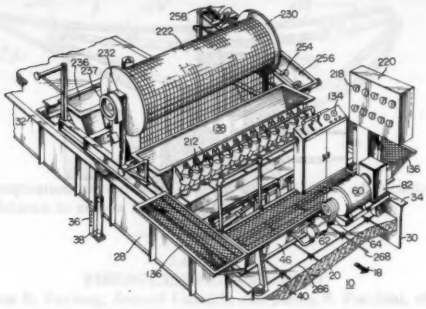
3,647,308
APPARATUS FOR FORMING A CORED CONCRETE SLAB

Robert L. Yost, Decatur, Ind., assignor to Joseph J. Dues, Dayton, Ohio

Filed Oct. 28, 1968, Ser. No. 771,152
Int. Cl. B28b *7/30*
U.S. Cl. 425—111 **15 Claims**

An apparatus and method for forming cored concrete slab utilizing an elongated fixed mold for forming the opposite sides and bottom surface of the slab. A concrete depositing and core forming assembly moves longitudinally over the mold, the assembly including a plurality of elongated core forming mandrels and a hopper which deposits a first layer of concrete in the mold generally to the top of the mandrels. A length of metal mesh is provided having its free end attached at one end of the mold, the mesh being coiled on a reel mounted on the assembly which lays the mesh over the man-

drels and the first layer, applying tension thereto, as the assembly moves toward the other end of the mold. Another



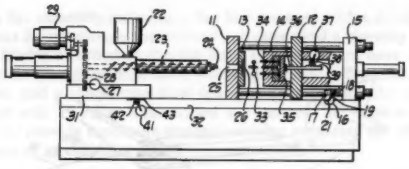
hopper is mounted on the assembly which deposits a second layer of concrete over the first layer and mesh.

3,647,309

APPARATUS FOR CONTROLLING AN INJECTION MOLDING MACHINE

Robert H. Thompson, Brunswick, Ohio, assignor to Van Dorn Company, Cleveland, Ohio

Filed Sept. 19, 1969, Ser. No. 859,525
Int. Cl. B29f *1/00*
U.S. Cl. 425—139 **3 Claims**



Injection molding apparatus is provided with readily preset means for automatically or semiautomatically causing certain functions to be performed in relation to the movement of reciprocating members including a platen, injection screw and eject mechanism. To this end sensing potentiometers are provided which produce voltages representing positions of the moving members and reference potentiometers are provided which are set to provide voltages representing various positions of the various movable members at which desired functions are to be performed. Voltage comparator-bistable circuits are provided for each function to be performed. They are so connected that when the sensing voltage agrees with the reference voltage actuation of the member of the molding apparatus or a decision function takes place. A dial is provided for each of the reference potentiometers to enable the operation desired to be preset.

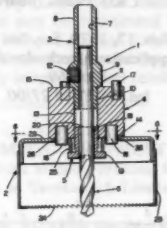
3,647,310

UNIVERSAL HOLE SAW ARBOR

Mansfield K. Morse, 1916 Frazer Avenue, N.W., Canton, Ohio

Filed Apr. 3, 1970, Ser. No. 25,352
Int. Cl. B23b *51/00*
U.S. Cl. 408—239 **10 Claims**

A universal hole saw arbor construction for mounting all types and sizes of hole saws which also accommodates the pilot drill used with the hole saws. The arbor construction includes as components a stem, a body, and various clamping nuts. These components are used in various combinations to mount and drive several types each of direct-driven and pin-



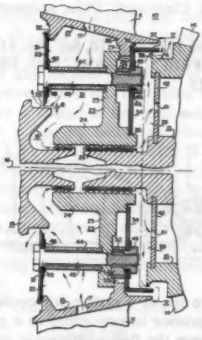
driven hole saw blades. The pilot drill is adjustable for predetermined settings of the drill with respect to the blade in accordance with the thickness of the workpiece being sawed.

3,647,311

TURBINE INTERSTAGE SEAL ASSEMBLY

Horace Wootton, Surf City, N.J., and George M. Mierley, Sr., Wilmington, Del., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 23, 1970, Ser. No. 31,120
Int. Cl. F01d *11/00, 11/10*
U.S. Cl. 415—113 **5 Claims**



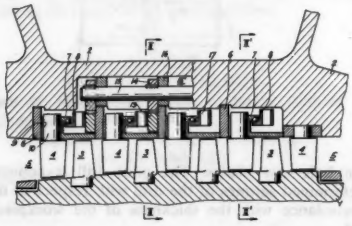
Interstage leakage around the inner shrouds of the stationary vanes of a turbine is reduced by a seal assembly disposed in a space between turbine rotor wheels or discs. The members of the seal assembly are separated from the hot stator vanes and are supported by a seal housing cooled by air supplied through the hollow stator vanes. Thus, clearance between stationary members of the seal assembly and the rotor can be made smaller than in prior structures which had to allow for expansion of the members.

3,647,312

MOUNTING OF STATOR BLADES IN AXIAL COMPRESSORS

Vaclav Kadera; Josef Novotny; Miloslav Vondruska; Jiri Feierfeil; Vlastimil Svoboda; Dusan Misarek; Miroslav Futera; Katerina Nacovska; Zbynek Janc; Adolf Nemec; Jiri Penkava, and Zdenek Vitkovec, all of Prague, Czechoslovakia, assignors to CKD Praha, oborovy podnik, Prague, Czechoslovakia

Filed Feb. 17, 1970, Ser. No. 11,948
Claims priority, application Czechoslovakia, Feb. 20, 1969, 1206/69
Int. Cl. F04d 27/00
U.S. Cl. 415—149 9 Claims



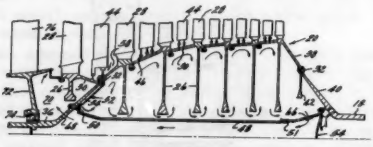
A compressor in which the blades of the stator are mounted in circular rows in a plurality of abutting axially aligned ring-shaped members secured in a recess in the inner wall of the stator, each ring is provided with an associated second annular ring in which is located link means extending into engagement with each of the blades mounted on the first ring. The link means are arranged to swivel the blades about their axes. Means are provided for oscillating the second ring member to actuate the link means.

3,647,313

GAS TURBINE ENGINES WITH COMPRESSOR ROTOR COOLING

Bernard L. Koff, Cincinnati, Ohio, assignor to General Electric Company

Filed June 1, 1970, Ser. No. 41,958
Int. Cl. F01d 5/14; F03b 11/00; F04d 29/38
U.S. Cl. 415—115 9 Claims



The disclosure shows a system for cooling the rotor of an axial flow compressor incorporated in a gas turbine engine. Air is ducted from the first compressor stage discharge into the interior of the rotor. This cooling air flows to the downstream end of the rotor and is then ducted back into the compressor inlet.

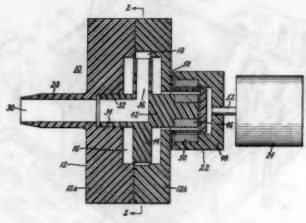
3,647,314

CENTRIFUGAL PUMP

Rudolf R. Laessig, Sumneytown, Pa., assignor to General Electric Company

Filed Apr. 8, 1970, Ser. No. 26,685
Int. Cl. F04d 1/00, 13/02
U.S. Cl. 415—206 3 Claims

A high-efficiency, low-specific speed centrifugal pump comprised of a discontinuous discharge rotor with an axial inlet and radially extending discharge passageways, a spiral collector for directly receiving the flow of fluid from the discharge passageways and a diffusor aligned with and extending substantially fully across the discharge end of said collector.

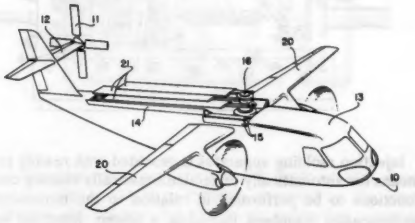


3,647,315

ROTOR BLADE PITCH CONTROL BY MECHANICAL HYDRAULIC SYSTEM SENSING BLADE DEFLECTION

Nels C. Rostad, Glendale, and Walter J. Davis, Woodland Hills, both of Calif., assignors to Lockheed Aircraft Corporation, Burbank, Calif.

Filed Nov. 28, 1969, Ser. No. 880,799
Int. Cl. B64c 27/22, 27/50
U.S. Cl. 416—31 16 Claims



A system of mechanisms for automatically controlling, at relatively low speed, rotation of a helicopter rotor blade responsive to gust conditions or flapping loads or to reverse flow of air on the rear or trailing edge of a rotor blade. The system comprises novel blade sensor means, amplifying means coupled thereto, converting means, pitch azimuth sensing means, means for locking out gyroscopic control, and automatic low-speed pitch control means.

3,647,316

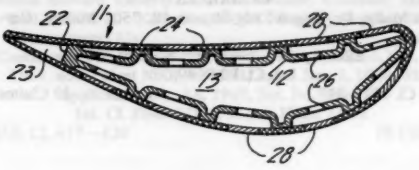
VARIABLE PERMEABILITY AND OXIDATION-RESISTANT AIRFOIL

Seymour Moskowitz, Fort Lee, N.J., assignor to Curtiss-Wright Corporation

Filed Apr. 28, 1970, Ser. No. 32,662
Int. Cl. F01d 5/18
U.S. Cl. 416—97 1 Claim

An air-cooled turbine blade for rotor or stator, having a strut member having airflow channels and covered with a sheath of porous mesh material, portions of which are im-

pregnated with a slurry of finely divided metal in a liquid ceramic binder which is then cured in place, to provide a

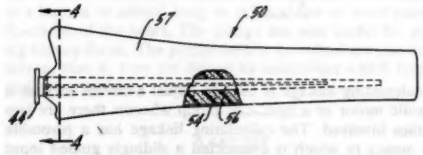


transpiration cooled blade having selected areas of variable resistance to airflow therethrough.

3,647,317
FIBERGLASS FAN ASSEMBLY

Donn B. Furlong; Samuel Luzaich, and James F. Forchini, all of Santa Rosa, Calif., assignors to Fluor Products Company, Inc.

Filed Mar. 19, 1970, Ser. No. 21,009
Int. Cl. F04d *19/00*
U.S. Cl. 416—226 **8 Claims**

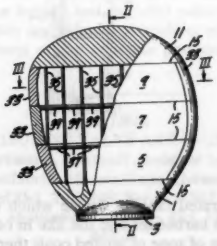


A fan assembly including a fan hub engaged with a driving means for rotation, a streamlined hub cover and a plurality of fan blades attached to the fan hub. The fan blades have an exterior fiberglass skin, filled with high-density polyurethane foam, and a reinforcing steel spar positioned within the exterior skin. The spar is fabricated in a tapered "H" cross section to provide maximum strength without impairing the efficiency of an optimum airfoil.

3,647,318
HOLLOW BLADE FOR PROPELLERS AND METHOD OF MAKING IT

Anders Lennart Pehrsson, and Sven-Ola Andersson, both of Kristinehman, Sweden, assignors to Aktiebolaget Karlstads Mekaniska Werkstad, Karlstad, Sweden

Filed July 9, 1969, Ser. No. 840,378
Claims priority, application Sweden, July 11, 1968, 9539/68
Int. Cl. B63h *1/26*
U.S. Cl. 416—233 **2 Claims**

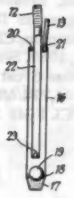


The body of a hollow propeller blade is fabricated in sections disposed generally transversely across the blade by progressively building up the body beginning from the root section and working toward the tip by welding a wall section on the pressure side of the blade to the preceding wall section and grinding both sides of such weldment to enable a very thorough inspection of the weld to be made before installing the corresponding wall on the suction side of the blade. Each succeeding section moving away from the root may be of progressively thinner plate material, and the wall plate of each section may be constituted by separate parts with the outer parts being of thinner plate material than the center part. Longitudinal stringers and transverse ribs extend across the body cavity in spaced-apart relation.

3,647,319
PUMPING EQUIPMENT

Peter McLean, and John William Wilkins, both of Middlesex, England, assignors to Terresearch Limited, Northolt, Middlesex, England

Filed Jan. 21, 1970, Ser. No. 4,539
Claims priority, application Great Britain, Feb. 6, 1969, 6,582/69
Int. Cl. F04f *3/00, 1/06*
U.S. Cl. 417—143 **2 Claims**



Pumping equipment for lowering the level of liquids in boreholes and the like and comprising a pump unit which is designed for location in such a borehole and for operation by an air pulse supply unit located externally of the borehole at ground or other convenient level. The pump unit comprises a tubular body which is sealed at one end and is provided at the other end with a liquid intake controlled by a one way valve, a discharge tube one end of which is disposed in the tubular body and is equipped with a one way valve while its other end is adapted to be connected to a discharge hose leading from the pump unit to a discharge point externally of the borehole and a connection on said tubular body to which an air supply line from the air pulse supply unit may be attached so that air may be supplied periodically to the interior of the tubular body.

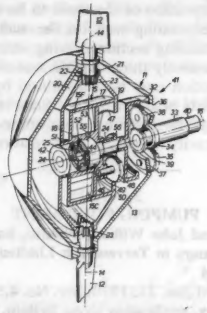
3,647,320
BLADED ROTORS

John Alfred Chilman, Painswick, and Ivor Harold Brooking, Wotton, both of England, assignors to Dowty Rotol Limited, Gloucester, England

Filed Apr. 7, 1970, Ser. No. 26,216
Claims priority, application Great Britain, Apr. 21, 1969, 20,135/69
Int. Cl. B63h *3/02, 3/08*
U.S. Cl. 416—157 **10 Claims**

A bladed rotor including blading adjustable by a valve-controlled fluid-operable actuator, the actuator and valve being rotatable with the rotor hub. The valve has one element adjustable with respect to the hub and a further element cooperable with the one element to control fluid supply to

the actuator. Feedback means connected between the actuator and the further element produce relative movement of



the actuator and further element, during which the latter follows up movement of said one element.

3,647,321

HYDRAULIC APPARATUS

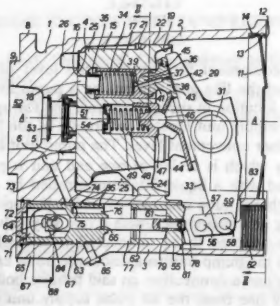
Kenneth Raymond Boydell, Bredons Hardwicke, near Tewkesbury, England, assignor to Dowty Technical Developments Limited, Brockhampton, Cheltenham, England

Filed Sept. 19, 1969, Ser. No. 859,447

Claims priority, application Great Britain, Sept. 20, 1968, 44,774/68

Int. Cl. F04b 1/26

U.S. Cl. 417—222 **2 Claims**



A swashplate pump or motor having a rotary cylinder block, cylinders in the block parallel to or inclined to the rotation axis, a valve on which the block is arranged to rotate and an inclinable swashplate located adjacent to one end of the cylinder block and engageable by pistons in the cylinders either directly or through the medium of slippers whereby the pistons are reciprocated when the block rotates. The pump or motor includes a structural member formed in one piece having, a. a flat valve surface against which the cylinder block rotates, b. a cylindrical bearing surface surrounding part of the cylinder block and in which the cylinder block rotates, c. apertures to support a transverse shaft carrying the swashplate for tilting movement, and d. a servomotor cylinder bore to house a servo piston arranged to adjust the inclination of the swashplate about the axis of the transverse shaft.

3,647,322

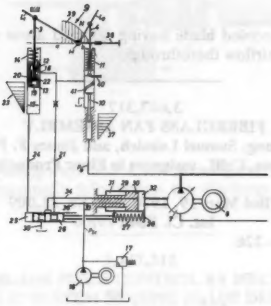
DEVICE FOR CONTROLLING QUANTITIES WHICH ARE DEFINED BY THE PRODUCT OF TWO MEASURED VARIABLES

Hans Molly, Dr.-Eugen-Essig-Strasse 48, 7502 Malsch, Germany

Filed Apr. 12, 1967, Ser. No. 630,388

Int. Cl. F04b 49/00

U.S. Cl. 417—217 **29 Claims**



A calculating linkage is used to adjust a device such as a hydraulic motor or a hydraulic pump wherein there are two variables involved. The calculating linkage has a pivotable lever means to which is connected a slidingly guided input member and a slidingly guided output member. The input member is connected to be responsive to one of the variables and the output member is connected to the device to adjust the other variable as an inverse function of the variation in the first variable.

3,647,323

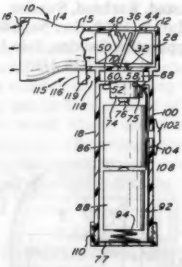
BATTERY OPERATED FANNING DEVICE

John C. Thomas, 451 Queensboro Lane, Haddonfield, N.J.

Filed Aug. 28, 1970, Ser. No. 67,716

Int. Cl. F04b 21/00, 17/00, 35/04; A47j 37/00

U.S. Cl. 417—234 **5 Claims**



A battery-operated fanning device which can be used in cooperation with barbecues and the like in order to produce a rapid expansion of zone of ignited coals therein. The device includes dry cell batteries in a housing having a fan and exhaust nozzle fastened thereto. A retainer is provided for mounting the device on a barbecue pit.

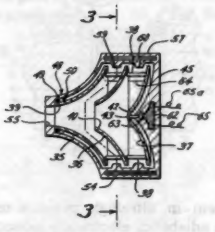
3,647,324
ELECTRICALLY DRIVEN PUMPS CAPABLE OF USE AS HEART PUMPS

Edson Howard Rafferty, 151 2nd Avenue, Excelsior, Minn., and Harold D. Kletschka, 4321 Woodley Square 0140, Montgomery, Ala.

Continuation-in-part of application Ser. No. 678,265, Oct. 26, 1967, now Patent No. 3,487,784, dated Jan. 6, 1970. This application Dec. 18, 1969, Ser. No. 886,137

Int. Cl. F04b *17/00, 35/04;* H02k *21/12*

U.S. Cl. 417—420 10 Claims



Pumps capable of use as heart pumps; that is, for pumping blood in connection with the maintenance of the life function in a human or animal body to replace one or more pumping functions of the heart. The pumps are also useful for pumping kidney fluids. The pumps herein described are electrically driven, that is, they are driven by assemblies which function as electric motors.

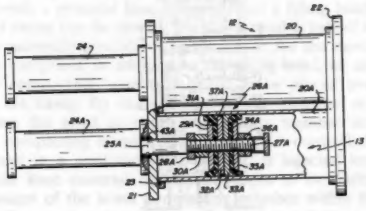
3,647,325
CONCRETE PUMP

Frederick S. Johnson, Calgary, Alberta, Canada, assignor to Consolidated Concrete Limited, Chinook Center, Calgary, Alberta, Canada, a part interest

Filed Apr. 15, 1968, Ser. No. 721,343

Int. Cl. F04b *39/68, 15/02, 23/04*

U.S. Cl. 417—508 8 Claims



A concrete pump having a pair of cylinders fed from a common hopper and pumping into a common outlet. An inlet valve in the hopper and an outlet valve in the outlet are actuated by piston and cylinder assemblies which in turn control the movement of the concrete pumping pistons in the cylinders.

3,647,326
DISTRIBUTING VALVE ARRANGEMENT

Heinz Bille, Dortmund, Germany, assignor to Walter Scheele KG Maschinenfabrik, Massen/Unna, Germany

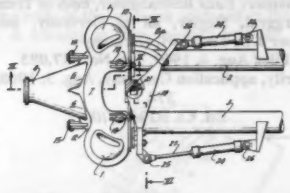
Filed Oct. 20, 1969, Ser. No. 867,564

Claims priority, application Germany, Oct. 18, 1968, P 18 03 819.2

Int. Cl. F04b *7/00, 15/02*

U.S. Cl. 417—517 13 Claims

A valve arrangement has first and second working cylinders for transporting a fluid mass, such as concrete. The working cylinders communicate with outlet conduits in a valve housing, and with inlet conduits in the same. A valve plate is movable between two positions, connecting alternately each working cylinder with an outlet conduit, while closing the respective inlet conduit.



3,647,327
CIRCULAR PISTON INTERNAL COMBUSTION MACHINE WITH REDUCED SHORT CIRCUIT FLOW

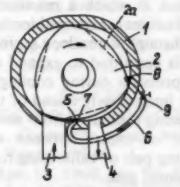
Harald Manthey, Mulheim (Ruhr), Germany, assignor to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Sept. 26, 1969, Ser. No. 861,405

Claims priority, application Germany, Oct. 5, 1968, P 18 01 423.3

Int. Cl. F01c *1/02;* F04c *17/02;* F02b *53/00*

U.S. Cl. 418—61 6 Claims



A circular piston internal combustion machine, in which conduit means lead into the interior of the machine between the inlet and outlet opening thereof and conveys gas pressure to the exhaust gas side into the gap between the piston and the adjacent mantle inner surface, said gas of higher pressure being withdrawn from a chamber section of the machine which has a higher pressure than prevails on the other side of said gap.

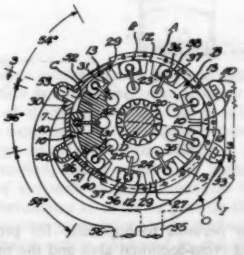
3,647,328
SLIPPER VANE AND VALVE COMBINATION FOR VANE-TYPE FLUID PUMP

Leonard N. Fox, Glendale, Calif., assignor to Crane Co., Burbank, Calif.

Filed May 25, 1970, Ser. No. 40,076

Int. Cl. F01c *19/00;* F03c *3/00;* F04c *27/00*

U.S. Cl. 418—136 12 Claims



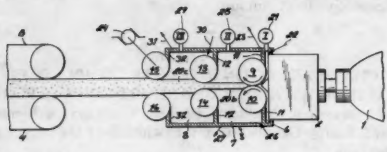
A pump vane embodies a shoe of broad area and pivotally linked to its rotor to follow the internal cam surface of a pump cylinder with an effective sealing action and a balanced pumping action.

3,647,329

APPARATUS FOR THE EXTRUSION OF CELLULAR SYNTHETIC RESINS

Fritz Reifenhauser; Hans Reifenhauser, both of Troisdorf, and Klaus Burggraf, Siegler, all of Germany, assignors to Reifenhauser KG, Troisdorf, Germany

Filed Aug. 4, 1969, Ser. No. 847,085
Claims priority, application Germany, Aug. 3, 1968, P 17 79 374.7
Int. Cl. B29d *27/00*
U.S. Cl. 425—4 **3 Claims**



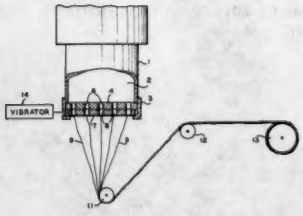
Apparatus for the extrusion of cellular (foamed) synthetic resins and elastomers in which a masticated and plastified synthetic resin or elastomer mixture, blended with a foaming agent, is extruded through a nozzle, e.g., in the form of slab. The extruded slab is permitted to expand against a superatmospheric counterpressure during cooling in one or more chambers provided immediately ahead of the extrusion nozzle, the chambers being separated from one another by pressure-retaining gates or locks. Between each chamber, a driven or autorotating pair of calibrating rolls may form part of the pressure-retaining gate.

3,647,330

APPARATUS FOR FORMING FILAMENTS

Paul D. Hann, Bartlesville, Okla., assignor to Phillips Petroleum Company

Original application June 27, 1966, Ser. No. 560,714, now Patent No. 3,538,206. Divided and this application June 25, 1970, Ser. No. 49,739
Int. Cl. D01d *3/00*, *5/22*
U.S. Cl. 425—76 **6 Claims**



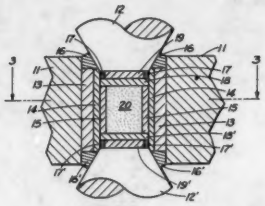
The invention pertains to apparatus for producing filaments of varying cross-sectional area and the produced filaments. The apparatus comprises a spinneret having a plurality of plates, at least one of which is vibrated.

3,647,331

ULTRAHIGH PRESSURE-TEMPERATURE APPARATUS

Tatsuo Kuratomi, 2-18, 4-chome, Hamatoke, Chigasaki, Japan

Filed Mar. 10, 1970, Ser. No. 18,143
Claims priority, application Japan, Mar. 10, 1969, 44/17548
Int. Cl. B30b *11/00*, *11/32*
U.S. Cl. 425—77 **3 Claims**



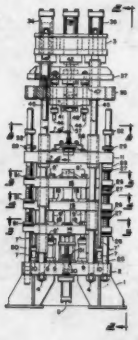
An improvement in ultrahigh pressure-temperature apparatus in which adiabatic, electrically nonconductive, thermostable cylinders are utilized to protect the outer portions of the apparatus from the pressures and temperatures generated within the innermost parts of the apparatus.

3,647,332

HYDRAULIC PRESS

Robert Leslie Schmaus, Mt. Prospect, Ill., assignor to Parker Hannifin Corporation, Cleveland, Ohio

Filed Aug. 29, 1969, Ser. No. 854,222
Int. Cl. B30b *11/00*
U.S. Cl. 425—78 **11 Claims**



A hydraulic press having upper and lower hydraulically actuated punches which are moved toward each other in a die containing powdered metal, the upper punch and die having interengageable positive stops and the upper and lower punches having interengageable positive stops so that the powdered metal is compressed by the punches to form an article of precise size. The downward force of the upper punch exceeds the upward force of the lower punch to assure engagement of the upper punch and die stops and to prevent premature upward movement of the upper punch out of the die. The press has control valves operative to cause upward movement of the punches in unison with respect to the die while the upper and lower punch stops are retained in engagement, thus to strip or eject the article from the die. In a press which has multiple lower punches pressure control valves set at selected pressures control the upward and downward sequence of operation of the lower punches

respectively to produce an article of uniform density and to effect stripping or ejection of the article from the lower punches without chipping off corners of the article. Multiple fluid motors of different sizes may be selectively coupled to multiple lower punches according to the sizes of the punches.

3,647,333

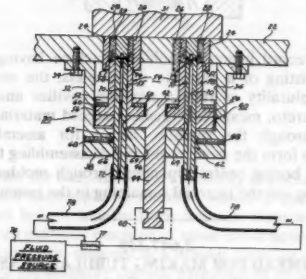
APPARATUS FOR INJECTING A FLUID INTO POWDERED MATERIALS BEING COMPACTED

Joseph E. Smith, Birmingham, Mich., assignor to Wolverine-Pentronix, Inc., Lincoln Park, Mich.

Continuation-in-part of application Ser. No. 850,204, Aug. 14, 1969. This application Nov. 10, 1969, Ser. No. 875,340

Int. Cl. B29f *1/03*

U.S. Cl. 425—78 **13 Claims**



A method and apparatus for adding an additive material, such as a fluid (gas or liquid) to a granular base material which is to be compacted, providing for maximum saturation of the granular base material with the fluid by injecting the fluid into the granular base material in metered proportions prior to or during the compacting operation. The method may be advantageously carried out in an apparatus such as a compacting press having a die provided with at least one die cavity into which a lower compacting member extends for movement upwardly through the die cavity. The die cavity is filled with a granular base material from a filling head positioned above the die cavity. The filling head is part of a positioner assembly pivotally supported over the die cavity and which comprises, in addition to the filling head, an anvil or upper compacting member adapted to be placed over the filled die cavity for compression of the granular material between the anvil or upper compacting member and the lower compacting member. The fluid, under controlled pressure and in a predetermined amount, is injected into the granular base material immediately prior to or during advancement of the lower compacting member within the die cavity for compression of the granular material into a fluid-saturated compacted article, and thereafter the fluid-saturated compacted article is ejected from the die cavity for disposal into a suitable receptacle.

3,647,334

CONSUMABLE FIXTURE FOR USE IN ASSEMBLING A MAGNETIC TAPE HEAD

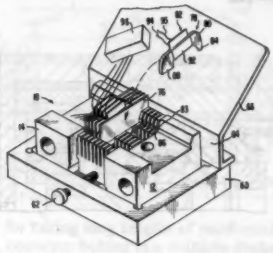
Louis H. Faure, Poughkeepsie, and Alfred T. Hardart, Wappingers Falls, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Original application Jan. 4, 1968, Ser. No. 696,009, now Patent No. 3,534,470, dated Oct. 20, 1970. Divided and this application Aug. 26, 1970, Ser. No. 67,294

Int. Cl. B29f *1/022*

U.S. Cl. 425—110 **9 Claims**

A consumable fixture and a process for assembling a multiple track tape head. The fixture contains a plurality of slots and shoulders for receiving shields and magnetic core assemblies each of which has a wound coil thereon. The fixture includes channels that communicate with two potting holes extending to the surface of the fixture. The shields and core assemblies are assembled, a pin connector is installed in the fixture, and the ends of the coils are soldered to the pins of the connector. A housing is then inserted into the fixture and



tests are performed for magnetic phasing, continuity and short circuits. The coil connecting wires and the gaps of the core assemblies are then encapsulated by injecting and pouring epoxy into the fixture. After the epoxy is cured, the outer portions of the fixture are broken off, and the remainder of the fixture and the excess portions of the shields are then cut off and the vertical gap portion of the assembly is ground.

3,647,335

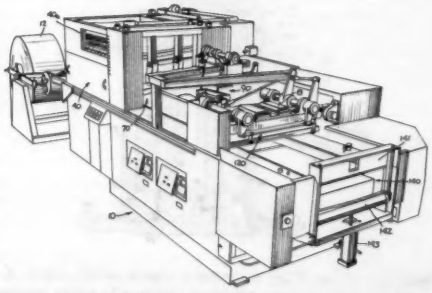
APPARATUS FOR FORMING CONTAINERS

Fred P. Brown, Jr., Centerville, Mass., assignor to Packaging Industries, Inc., Hyannis, Mass.

Filed Apr. 11, 1969, Ser. No. 815,292

Int. Cl. B29c *3/04*, *3/06*

U.S. Cl. 425—143 **21 Claims**



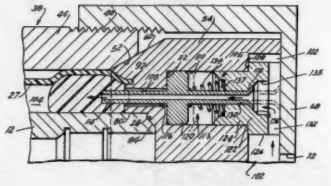
The disclosure relates to a method and apparatus for forming articles such as containers. In accordance with the disclosure, a web of thermoplastic material is held along the opposite edges extending along the length thereof while being passed through an article-forming station, a printing station, a trimming station, and if required, a heating station. The movement of the web of plastic material through the apparatus is intermittent in order to provide time sufficient to enable the necessary operations to be performed at each station. The formed article produced by the machine is ready for its ultimate use when discharged from the last station of the machine.

3,647,336

MOLD FOR MANUFACTURE OF CORED RUBBER ROLLS

Charles N. Pruitt; Douglas L. Segars, both of North Charleston, and Walter L. Miller, Goose Creek, all of S.C., assignors to Raybestos-Manhattan, Inc., Passaic, N.J.

Filed Aug. 26, 1970, Ser. No. 67,040
Int. Cl. B29f 1/00
U.S. Cl. 425—146 **14 Claims**



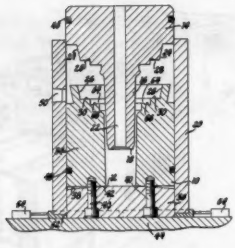
An apparatus for molding a metal-cored rubber roll in which the mold assembly is effectively sealed during cure and vulcanization. The mold assembly comprises a mold casing having a cavity. Rubber is extruded into the mold cavity through a valve mechanism mounted in an aperture communicating with the mold cavity. During cure the increased pressure of the rubber within the mold cavity resulting from the elevated temperature to which the mold is subjected is effective to move the valve mechanism to position effectively sealing the mold cavity whereby the rubber is cured under extremely high pressure. As a result shrinkage is reduced and the tolerances and concentricity of the roll are more uniform and precise.

3,647,337

PRECISION MOLDING APPARATUS

Robert L. Dega, Mount Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed June 17, 1969, Ser. No. 834,105
Int. Cl. B29f 1/00
U.S. Cl. 425—242 **5 Claims**



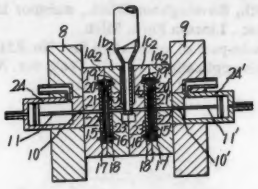
An apparatus for injection molding dimensionally precise tubular elastomeric articles. The apparatus includes male and female mold members longitudinally movable relative to each other and adapted to form a tubular cavity therebetween, longitudinally and transversely disposed precision alignment surfaces, and means whereby an annular injection orifice is provided at one end of the cavity while the other end is provided with an annular vent opening and evacuation means. In the molding process, elastomeric material is injected into the cavity through the orifice until the mold cavity is filled. Thereafter, pressure is applied to the mold whereby the orifice and the annular vent opening are restricted and the material is subjected to a uniform pressure at all points within the mold cavity to produce a dimensionally precise elastomeric product.

3,647,338

DISC RECORD INJECTION MOLDING MACHINE

Hideo Ise, Kawasaki-shi, Japan, assignor to Nippon Columbia Kabushikikaisha (Nippon Columbia Co., Ltd.), Tokyo, Japan

Filed Sept. 15, 1969, Ser. No. 857,948
Int. Cl. B29d 17/00
U.S. Cl. 425—247 **1 Claim**



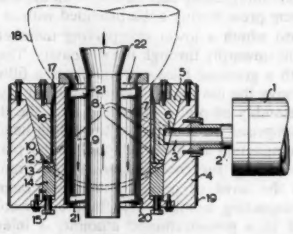
A disc record injection molding machine having a metal mold consisting of a plurality of templets, the metal mold having a plurality of record molding cavities and runners leading thereto, means for injecting record material into the cavities through the runners, means for assembling the templets to form the metal mold and disassembling them, and means for boring central openings through molded records and pushing out the material remaining in the runners.

3,647,339

BLOWHEAD FOR MAKING TUBULAR PLASTICS

Hartmut Upmeier, Tecklenburg, Germany, assignor to Windmoller & Holscher, Lengerich of Westphalia, Germany

Filed Jan. 13, 1970, Ser. No. 2,517
Claims priority, application Germany, Jan. 22, 1969, P 19 03 110.8
Int. Cl. B29d 23/04
U.S. Cl. 425—326 **7 Claims**

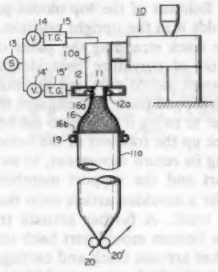


A blowhead for making tubular plastics film comprising a housing having a central aperture for installing special equipment, a lateral supply passage in the housing for the entry of molten plastics material, branch passages which branch from the supply passage and extend, each in its own direction, through 90° about an insert in the housing, are then shortly curved to divert the flow of plastics material axially of the blowhead against the direction in which film is blown, and then diverge constantly in the peripheral direction until they merge at positions at an end of the insert, recesses formed in the housing adjacent the end of the insert to direct the flow of plastics material over projecting surfaces provided on the end of the insert and into an annular passage leading to a nozzle orifice from which the plastics material is blown as a film, the projecting surfaces and recesses extending in the direction opposite to the film blowing direction such that, starting from the sharp curvatures, the flow path for the plastics material to the nozzle orifice has the same length in every angular direction of the diverging portions of the branch passages.

3,647,340
APPARATUS FOR MANUFACTURING BIAXIALLY ORIENTED FILM

Masao Sakurai, Yokohama, and Kikuo Muto, Kawasaki, both of Japan, assignors to Gunze Kobunshi Kogyo Kabushiki Kaisha, Naka-gun Kansagawa Prefecture, Japan

Filed July 28, 1970, Ser. No. 58,963
Claims priority, application Japan, Aug. 16, 1969, 44/64525; Aug. 30, 1969, 44/68346
Int. Cl. B29d 23/04
U.S. Cl. 425—326 12 Claims

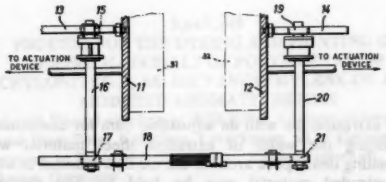


Apparatus for manufacturing a biaxially oriented film from a semifused thermoplastic material which is extruded in a continuous hollow tubular form from an annular discharge nozzle of an extruder machine of usual construction, wherein said thermoplastic material in a tubular form, or parison, is, after being preliminarily cooled, expanded in an air permeable heat-resistive enclosure which is generally shaped like an inverted funnel with its lower peripheral edge enlarged to an inside diameter corresponding to the outside diameter of the finally expanded tubular film. The tubular material is expanded with pressurized air or steam blown thereinto and, as the tubular material is expanded, it is cooled to a temperature ranging from the softening point to melting point of the thermoplastic material. The tubular film thus produced is then cooled and set as it is drawn and stretched in the longitudinal direction.

3,647,341
MOLD SYNCHRONIZING APPARATUS

Stefan Fischer, Im Korresgarten 21, and Rainer Fischer, Am Wildtor 2, both of Lohmar, Germany

Filed Mar. 5, 1969, Ser. No. 804,566
Claims priority, application Germany, Mar. 7, 1968, P 17 04 067.4
Int. Cl. B29c 1/16
U.S. Cl. 425—326 2 Claims

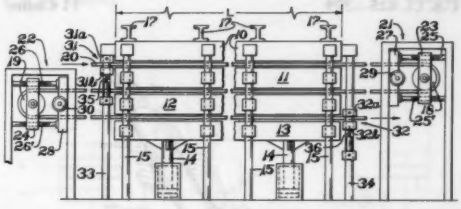


The present invention relates to an apparatus for the production of hollow articles from thermoplastic synthetic plastic materials by the blowing method employing a two part mold which is opened and closed in the cyclic operation of the apparatus and which in turn is blown up in the mold to form the finished hollow article, and wherein the mold halves are coupled for synchronous movement with respect to one another.

3,647,342
APPARATUS FOR VULCANIZING OPEN END BELTING

David G. Hunt, Akron, Ohio, assignor to The B. F. Goodrich Company, New York, N.Y.

Filed Jan. 22, 1969, Ser. No. 793,033
Int. Cl. B29h 7/22; B29d 29/00
U.S. Cl. 425—330 4 Claims

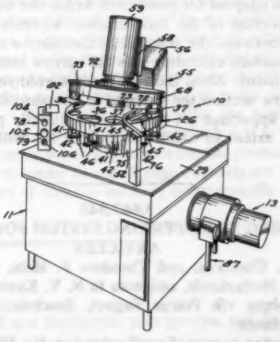


Apparatus for curing long lengths of reinforced elastomeric, open end, conveyor belting in a multiple-decked vulcanizing press. The portions of the belt being cured are subjected to substantially uniform stretch prior to closing the press by outrigger rollers over which the belt is trained as it passes continuously from one platen to another. When the portions between the press platens are cured, the belting is advanced longitudinally over the rollers to permit vulcanizing the portions previously extending over the rollers.

3,647,343
MATERIAL COMPACTING EQUIPMENT

Donald W. Garnett, Grand Ledge, Mich., assignor to The Olofsson Corporation, Lansing, Mich., and Mahogany Farms, Inc., Williamston, Mich.

Filed Nov. 10, 1969, Ser. No. 875,267
Int. Cl. B29c 3/04
U.S. Cl. 425—350 13 Claims



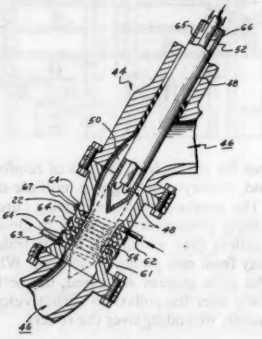
A motor driven rotary compactor table carries a circumferential series of material-receiving pockets, each bottomed by an ejector cam-operated during the table rotation to eject a shaped and compacted product from its pocket. A compactor plate of the same diameter is journaled above the table on an axis at an acute angle to the table axis, and theoretically intersecting the latter at the table surface. The plate carries an annual series of compactor plungers equal in number and circumferential spacing to the table pockets; and the inclination and vertical relationship of table and plate to one another are such that the plungers enter into the respective table pockets at the apex of an acute angle theoretically defined by planes of the convergent, mutually facing plate and table surfaces. Thus, in compacting material in the pockets, the plungers also effect a cog and wheellike drive of the compactor plate.

3,647,344

APPARATUS FOR CONTROLLING BACK PRESSURE IN AN EXTRUDER

Andrew D. Skibo, Monson, and Chester L. Woodworth, East Longmeadow, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Mar. 16, 1970, Ser. No. 19,886
Int. Cl. F15d *1/12*; F16k *47/00*; B29f *3/08*
U.S. Cl. 425—379 **11 Claims**



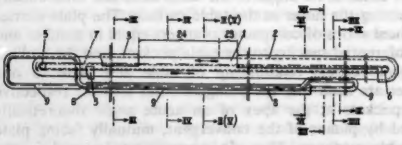
A pressure control valve or apparatus adapted for controlling the pressure of a viscous fluid in a conduit by producing a pressure drop which is substantially directly proportional to the valve stem position. The valve or apparatus comprises in combination a valve body having a streamlined flow channel which has a narrow section of substantially uniform cross-sectional dimension opening into a wide section of substantially larger cross-sectional dimension and a plunger which is slidably mounted within the channel. The plunger is adapted for movement within the wide section and narrow section of the flow channel wherein the clearance distance between the sidewall of the narrow section and the plunger surface extending into the narrow section is substantially constant. When the plunger is moved reciprocally into the narrow section the changes in pressure drop across the valve or apparatus are substantially directly proportional to the axial extent to which the plunger lies within the narrow section.

3,647,345

MOLDING TRANSFERRING SYSTEM FOR CERAMIC ARTICLES

Frans D. Claessens, and Theodore F. Hein, both of Maastricht, Netherlands, assignors to N. V. Koninklijke Sphinx-Ceramique v/h Petrus Regout, Boschstraat, Maastricht, Netherlands

Continuation-in-part of application Ser. No. 592,448, Nov. 7, 1966, now abandoned. This application May 18, 1970, Ser. No. 38,272
Int. Cl. B28b *15/00*
U.S. Cl. 425—439 **11 Claims**



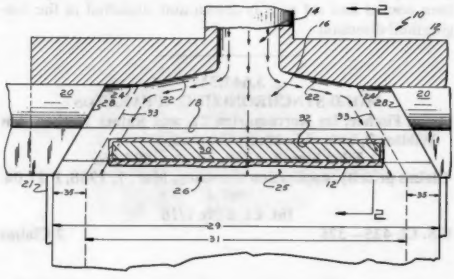
Two trucks are caused to move in side-by-side relation on a pair of parallel tracks, one truck carrying top and bottom mould parts pivoted on opposite sides of the truck and having followers remote from the respective pivot axes. The other truck carries a horizontal support member pivoted on one side of this truck coaxial with the pivot axis of the bottom mould part on the first truck. The support member also has a follower remote from its pivot axis and which is spaced from it by the same amount as is the spacing between the follower of the bottom mould part and its pivot axis. As the truck moves along, the follower of the top mould part engages a carriage movable along an arcuate track having its center of curvature on the pivot axis of the top mould part and which carries the top mould part to an upright position. Thereafter the follower of the top mould part enters a fixed guide which holds it in the upright position. Beyond this is a second arcuate track straddling the paths of the trucks and having its center of curvature coincidental with the pivot axes of the bottom mould part and the support member. A carriage on this second track first engages the follower of the support member to swing it over onto the bottom mould part and then to pick up the follower of the bottom mould part as well and, during its return movement, to swing both the bottom mould part and the support member onto the other truck to transfer a moulded article onto the support member of such other truck. A further arcuate track and carriage then return the bottom mould part back onto the first truck, and a still further arcuate track and carriage then returns the top mould part onto the bottom mould part.

3,647,346

EXTRUSION DIE WITH ADJUSTABLE DAMS

Armand F. Minnie, Ludlow, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed Apr. 27, 1970, Ser. No. 32,199
Int. Cl. B29f *3/04*
U.S. Cl. 425—466 **10 Claims**



An extrusion die with an adjustable dam for continuously controlling the width of extruded sheet material while eliminating dead space areas in the die flow channel in which the extruded material may be held up and thermally degraded. The die body has a streamlined feed channel which opens into a horizontally oriented, elongated, distribution channel having (a) a gradually outwardly tapering transition section which opens into (b) a horizontal uniform section located adjacent to the lateral end of the transition section. The distribution channel, including the transition section and the uniform section, opens into a coextensive, narrow, horizontally oriented, outlet channel having an orifice. An adjustable dam is adapted to sealingly engage and move

within the uniform section and the adjoining portion of the outlet channel to control the width of the extruded sheet material by controlling the width of the distribution channel, the outlet channel, and the orifice. Because of the streamlined configuration of the distribution channel, the outlet channel, and the cooperating dam, the extruded material flows freely through the die with no material dead spots regardless of the position of the dam within the uniform section. The die can operate effectively with one dam and one uniform section. However the use of two dams and two uniform sections located at the opposite lateral ends of the transition section provides greater flexibility in controlling the width of the extruded sheet.

3,647,347

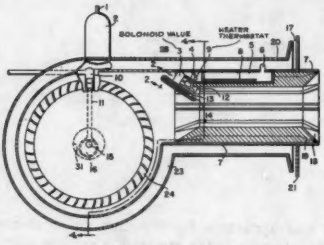
FLASH VAPOR BURNER

Hosein M. Shakiba, 4527 Walnut Street, Philadelphia, Pa.

Filed July 8, 1970, Ser. No. 53,059

Int. Cl. F23n *1/00*

U.S. Cl. 431—37 **15 Claims**



The flash burner utilizes the total thermal efficiency of the fuel to develop heat. The fuel is kept under high pressure and heated beyond the boiling point. This superheated liquid fuel which is under pressure, enters into the low-pressure area of the combustion channels, where it flashes into vapor and prompt mixing of this vapor with air causes complete burning and heat production. The device has the advantages of great fuel economy, no likelihood of causing air pollution, and low maintenance.

3,647,348

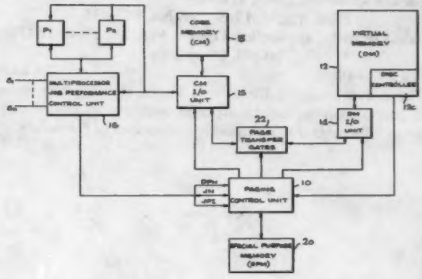
HARDWARE-ORIENTED PAGING CONTROL SYSTEM

William R. Smith, Mountain View; Rex Rice, Menlo Park, and Stanley Mazor, Sunnyvale, all of Calif., assignors to Fairchild Camera and Instrument Corporation, Syosset, Long Island, N.Y.

Filed Jan. 19, 1970, Ser. No. 3,626

Int. Cl. G06f *9/10, 13/00, 15/16*

U.S. Cl. 444—1 **2 Claims**



A system for controlling the transfer of pages between a large disc memory and a much smaller core memory in response to requests for the transfer of pages from the disc memory to the core memory, including a first plurality of control words, which define an In-Core List. Each of these control words is associated with a different core page. The word's fields are used to designate various information related to the disc page located in the core page associated with the word, as well as the availability of the core page to have a disc page transferred thereto. The system includes circuitry to form a Paging Queue comprising of other control words. Each word in the Paging Queue includes all the information necessary to define which core page should be emptied of which disc page located therein, to make room for a new disc page which is requested, and/or the number of a new disc page and the core page into which it is to be transferred. The transferring of pages between the memories is independent of the order in which page requests are received. The accessibility of the core memory is dynamically variable.

CHEMICAL

3,647,349

PROCESS FOR THE DYEING AND PRINTING OF SHAPED MATERIALS OF POLYMERS FROM ACRYLONITRILE, AS.-DICYANOETHYLENE OR ACID-MODIFIED AROMATIC ESTERS

Roderich Raue, Leverkusen; Willi Eifler, Cologne-Stammheim, and Hans-Peter Kuhlthau, Leverkusen, all of Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

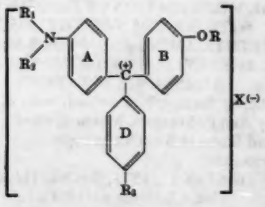
Filed Nov. 20, 1969, Ser. No. 878,549

Claims priority, application Germany, Nov. 29, 1968, P 18 11 652.4

Int. Cl. D06p *3/76*

U.S. Cl. 8—4 **8 Claims**

The dyeing or printing of polymers of acrylonitrile, polymers of as.-dicyanoethylene, or acid-modified aromatic polyesters, or acid-modified superpolyamides by using as a dyestuff a triaryl-methane compound which is free from sulphonic acid and carboxylic acid groups, and has the formula



(I)

in which R is alkyl, aralkyl, cycloalkyl or aryl; R_1 is hydrogen, alkyl, aralkyl or cycloalkyl; R_2 is alkyl, aralkyl, cycloalkyl or

aryl; R_1 and R_2 together with the nitrogen atom, or R_1 or R_2 with a carbon atom in the O-position in the ring A may form a heterocyclic ring; R_3 is hydrogen, alkyl, aralkyl, aryl, alkoxy, aralkoxy, aryloxy, alkylmercapto, arylmercapto, halogen, carboxylic acid ester radical, carbonamido, sulphonamido, cyano, nitro, alkylsulphonyl, aralkylsulphonyl, arylsulphonyl, or acyl; and X is the radical of an anion.

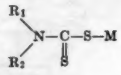
3,647,350

DITHIOCARBAZATES AND DITHIOCARBAMATES WITH ACID AND DIRECT DYES

Jean Galerne, Paris, France, assignor to Eugene-Gallia, Societe Anonyme, Paris, France

Filed Aug. 4, 1969, Ser. No. 847,436
Claims priority, application France, Aug. 28, 1968, 164389
Int. Cl. D06p *3/00*
U.S. Cl. 8—10 **2 Claims**

These dyes, notably for animal fibers, such as hair, wool, silk, and containing essentially acid or direct dyestuffs, comprise as adjuvants dithiocarbamic derivatives of formula:



wherein M is NH_4, K or Na, and R_1 and R_2 identical or different represent each a hydrogen atom, a possibly substituted alkyl or phenyl, a NR_5 (R_4) group or a N CR_5 (R_6) group, R_1 and R_2 being also able to form together and with the nitrogen atom to which they are linked a heterocycle. These adjuvants improve substantially the affinity of said dyestuffs for the fibers, consequently the intensity of the shade, as well as the uniformity of the dyeing.

3,647,351

PYRIDINE DYESTUFF INTERMEDIATES IN A HAIR DYEING COMPOSITION AND METHOD

Fritz-Walter Lange, Puccheim, Germany, assignor to Hans Schwarzkopf GmbH, Hamburg, Germany

Continuation-in-part of application Ser. No. 360,449, Apr. 16, 1964, now abandoned. This application Mar. 11, 1968, Ser. No. 711,906. The portion of the term of this patent subsequent to Aug. 10, 1982, has been disclaimed. Claims priority, application Germany, Apr. 19, 1963, Sch #33135
Int. Cl. A61k *7/12*
U.S. Cl. 8—10.2 **21 Claims**

Hair is dyed in a natural-looking color with a composition comprising a carrier compatible with hair in which at least one of the following compounds is dispersed in an effective amount:

2,5′-diamino-bis-(3,2′-pyridyl)amine,
5-hydroxy-5′-amino-bis-(2,2′-pyridyl)amine,
6-amino-pyridylamino (2)-1,4-diaminobenzene, and acid salts, particularly hydrochloric acid salts, thereof.

3,647,352

CHEMICAL MODIFICATION OF FIBROUS CELLULOSE WITH SODIUM N-METHYLBIS(2-SULFATOETHYL)AMINE AND WITH N-METHYLBIS(2-CHLOROETHYL)AMINE TO IMPART CREASE RESISTANCE IN FABRICS

Earl J. Roberts; Stanley P. Rowland, both of New Orleans, and Mary Ann F. Brannan, Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture

Filed Feb. 17, 1971, Ser. No. 116,283
Int. Cl. D06m *13/36, 13/38*
U.S. Cl. 8—116.2 **6 Claims**

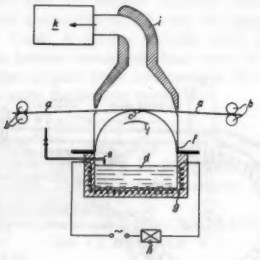
N-methylbis(2-sulfatoethyl)amine and the monosodium salt of this new compound have been prepared and applied to cotton to impart crease-resistant characteristics to the fabrics. N-methylbis(2-chloroethyl)amine, a related known compound, was also reacted with the fibrous cellulose. Respectively, a pad-cure process was employed on the one and a pad wet-cure process was employed on the other to produce cross-linked cellulosic derivatives.

3,647,353

METHOD AND APPARATUS FOR PROCESSING CELLULOSE-CONTAINING TEXTILES WITH THE VAPORS FROM AN AZEOTROPIC LIQUID COMPRISING AN ACIDIC CATALYST

Hans Calzaferri, Ilanz; Werner Kunz, Uerikon; Martin W. Schwemmer, Urdorf, and Max Wyler, Winterthur, all of Switzerland, assignors to Triatex International AG fur Textile Forschung und Entwicklung, Zurich, Switzerland

Filed Aug. 9, 1967, Ser. No. 659,429
Claims priority, application Switzerland, Aug. 24, 1966, 12,222/66
Int. Cl. D06m *1/16, 13/38, 13/14*
U.S. Cl. 8—116.3 **6 Claims**



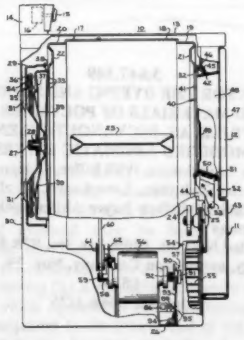
Method and apparatus for finishing cellulose-containing textile material wherein the material is treated with an acid catalyst by contacting the material with the vapor of a liquid azeotropic mixture containing the acid catalyst, and wherein the temperature of the liquid azeotropic mixture is controlled to regulate the amount of catalyst present in the vapor phase for contact with the textile material.

3,647,354

FABRIC-TREATING METHOD

Leopold Loeb, Louisville, Ky., assignor to General Electric Company

Filed Nov. 24, 1969, Ser. No. 879,031
Int. Cl. D06l *1/00*
U.S. Cl. 8—158 **4 Claims**



An improved fabric-treating method is provided which may be used to treat fabrics with postwash treating chemi-

cals, or to clean previously laundered fabrics of soil and detergent left deposited thereon, to to perform a combination of these functions. When used solely to clean previously laundered fabrics of soil and detergent, the fabrics are tumbled together with a quantity of water and transfer agent. When the process is also used to treat fabrics with postwash treating chemicals, such treating chemicals are tumbled simultaneously with the fabrics, water and transfer agent. In each instance, the quantity of water is sufficient only to dampen the fabrics. The tumbling causes the water and the transfer agent to contact the fabrics and causes soil and detergent from the fabrics to be distributed over the combined surface areas of the fabrics and the transfer agent. When a treating chemical is also employed, the tumbling additionally causes the treating chemical to be distributed over the surfaces of the fabrics. Following such tumbling, the soiled transfer agent is separated from the fabrics, whereby the fabrics are cleaned of soil and detergent distributed onto the transfer agent.

3,647,355

PROCESS

Meurig W. Williams, Rochester, N.Y., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 7, 1970, Ser. No. 26,435

Int. Cl. D06m *3/30*

U.S. Cl. 8—130.1 **6 Claims**

Fabrics containing fibers of selected polymers prepared from bis(4-aminocyclohexyl)methane and linear aliphatic dicarboxylic acids, bis(4-isothiocyanatocyclohexyl)methane or bis(4-isocyanatocyclohexyl)methane develop improved liveliness upon treatment with chloroform.

3,647,356

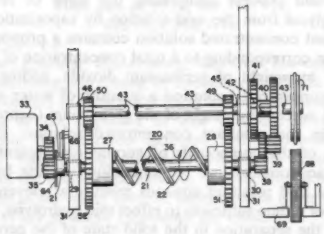
PRINTER DRIVE WITH PAGE RECORD FEED

Alvin Feder, Skokie, Ill., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Feb. 13, 1970, Ser. No. 11,258

Int. Cl. B41j *11/24*, *11/38*

U.S. Cl. 346—101 **9 Claims**



A printer drive mechanism for a printer including a cylindrical platen and page record mechanism coaxially mounted on the platen shaft. A gear train connects the platen to the page record feed mechanism allowing synchronous but independent rotation of the platen and the page record feed mechanism, with the page record feed mechanism rotating at a slower rate than the platen. A stepping motor is used to rotate the platen, and printing occurs after each step of the motor thereby preventing the printed dot from blurring due to platen rotation or page record advancement.

3,647,357

PROCESS FOR MIXING GASES, LIQUIDS OR FINELY GRAINED SOLIDS WITH A CARRIER GAS AND FOR THE MANUFACTURE OF REACTION PRODUCTS

Peter Niedner, Muhlerstr. 104, Bendorf; Gerhard Diez, Koblenz-Olperstr. 21, Bendorf-Sayn, and Heinz Thubeauville, Roomarsheide 104, Bochum, all of Germany

Original application Aug. 29, 1966, Ser. No. 576,507, now Patent No. 3,459,949, dated Feb. 17, 1970. Divided and this application Jan. 5, 1970, Ser. No. 5,409

Claims priority, application Germany, Aug. 28, 1965, O 11 087

Int. Cl. C01q *1/00*

U.S. Cl. 23—1 R **6 Claims**

A process for the thermic treatment of a substance with a carrier gas comprising steps of: introducing the carrier gas from the bottom of a chamber while imparting a twist to the gas under high-kinetic energy; the chamber being axially symmetrical and having an upwardly tapering wall and a straight-walled portion at the top of the conical chamber; radially expanding the carrier gas to cause an upward flow thereof under the influence of centrifugal force, thereby creating an area of reduced pressure at the center of the chamber; diverting the upward flow to form a spiral; redirecting a portion of the gas to flow back through the area of reduced pressure and to mix with newly entered gas, thus creating an area of high turbulence; introducing the substance to be treated into the area of high turbulence and contacting it with the carrier gas; and removing the treated substance together with a portion of the carrier gas near the top of the chamber.

3,647,358

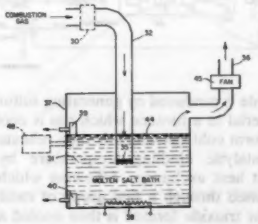
METHOD OF CATALYTICALLY INDUCING OXIDATION OF CARBONACEOUS MATERIALS BY THE USE OF MOLTEN SALTS

Jacob Greenberg, Ventnor City, N.J., assignor to Anti-Pollution Systems, Inc., Pleasantville, N.J.

Continuation-in-part of application Ser. No. 781,495, Dec. 5, 1968, now abandoned , and a continuation-in-part of 781,383, Dec. 5, 1968, now abandoned. This application July 23, 1970, Ser. No. 57,593

Int. Cl. B01d *53/34*

U.S. Cl. 23—2 R **47 Claims**



Oxidation of gaseous, liquid and solid carbonaceous materials, with removal of normally unburned pollutant

products of combustion such as carbon, carbon monoxide and hydrocarbons, by contacting such materials with a molten salt. The molten salt acts as a catalyst in inducing relatively complete oxidation of the materials at temperatures below their normal combustion temperatures, and with substantial decrease in the unburned pollutant products. In one form, the salt may be a neutral salt with which the material, in the presence of oxygen, is contacted. In another form, the catalytic salt also contains a chemical oxidizer which continuously releases nascent oxygen and retakes ambient oxygen, thereby maintaining an equilibrium pressure of oxygen gas which aids the oxidation process.

3,647,359

RECOVERY OF MERCURY

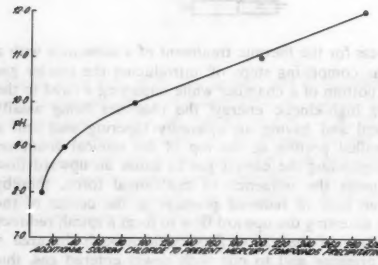
David Bell, Holmes Chapel, near Crewe, England, assignor to BP Chemicals (U.K.) Limited, London, England

Filed Aug. 29, 1969, Ser. No. 854,195

Claims priority, application Great Britain, Sept. 21, 1968, 44,984/68

Int. Cl. B01d *53/34*

U.S. Cl. 23—2 R **4 Claims**



Removal of mercury from a gas stream by washing the gas with alkaline hypochlorite containing added alkali metal or calcium chloride.

3,647,360

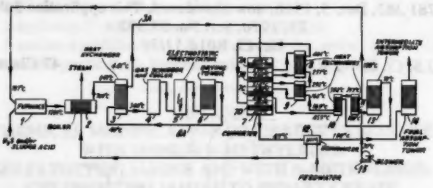
PROCESS FOR THE PRODUCTION OF SULFUR TRIOXIDE BY THE COLD GAS PROCESS

Walter Jaeger, Stroudsburg, Pa., assignor to Ovitron Corporation, Newburgh, N.Y.

Continuation-in-part of application Ser. No. 816,687, Apr. 16, 1969. This application Apr. 13, 1970, Ser. No. 27,541

Int. Cl. C01b *17/76, 17/80*

U.S. Cl. 23—168 **4 Claims**



Sulfur trioxide is produced by generating sulfur dioxide gas from raw material in a furnace which gas is cooled, cleaned and dried to form cold gas which is then reheated to its corresponding catalytic kindling temperature by passing it through a first heat exchanger, following which the heated cold gas is passed through a first group of catalytic converters. The sulfur trioxide formed is then cooled and removed from the gas stream in a first or intermediate absorber. The remaining tail gas from the first absorber is reheated by heat exchange with hot gas by means of heat exchangers serially connected to the first group of converters and the thus-heated tail gas then finally converted in a last stage catalytic converter to sulfur trioxide which is recovered in a second absorber, this process being known as the double absorption process.

3,647,361

TWO-STAGE COUNTERCURRENT LEACHING PROCESS FOR THE RECOVERY OF PHOSPHATES, YTTRIUM AND RARE EARTH VALUES

Enzo L. Coltrinari, and James K. Kindig, both of Arvada, Colo., assignors to Molybdenum Corporation of America, New York, N.Y.

Filed Dec. 3, 1969, Ser. No. 881,742

Int. Cl. C22b *59/00*

U.S. Cl. 23—18 **7 Claims**

Phosphates and yttrium and rare earth metal values are recovered from solid materials, particularly phosphate ores or commercial concentrates and especially apatites, in a two-stage leaching process comprising a first extraction with an aqueous acid solution to remove part of the phosphate and a substantial part of the yttrium and a second extraction with stronger acid to remove the residual phosphate, yttrium and rare earth values, then recovering the products from the first and second extracts. The process is carried out in a countercurrent manner by using the aqueous acid solution from the second extraction, after partial removal of yttrium and rare earth values, in the first extraction.

3,647,362

POLYESTER CATALYST RECOVERY

Gordon Edwin Head; Kenneth Morgan Jones, and Eric Gendle, all of Harrogate, England, assignors to Imperival Chemical Industries Limited, London, England

Filed Jan. 23, 1970, Ser. No. 5,372

Claims priority, application Great Britain, Jan. 27, 1969, 4,447/69

Int. Cl. C22b *59/00*

U.S. Cl. 23—22 **4 Claims**

A process for the recovery of germanium dioxide in a form and degree of purity suitable for catalyzing a polycondensation from an ethylene glycol solution of a reaction product of germanium dioxide and ethylene glycol, said ethylene glycol solution containing a proportion of germanium in amount less than that corresponding to a total concentration of 2 percent of germanium dioxide by weight based on the weight of solution, said process comprising the steps of removing ethylene glycol from the said solution by vaporization until the resultant concentrated solution contains a proportion of germanium corresponding to a total concentration of at least 2 percent by weight of germanium dioxide, adding to the resultant concentrated solution a quantity of water equal to at least 34 percent by weight of the germanium (expressed as dioxide) in the resultant concentrated solution, effecting hydrolysis of the compounds of germanium present in the resultant aqueous mixture to germanium dioxide by maintaining the said resultant aqueous mixture at elevated temperature for a time sufficient to effect said hydrolysis, cooling to ensure the separation in the solid state of the germanium dioxide so produced, and isolating the said germanium dioxide.

3,647,363

RECOVERY OF SULFUR VALUES FROM FLUE GASES WITH OXIDIZED NEUTRAL SULFITE GREEN LIQUOR

Nallan C. S. Chari, Valdosta, Ga.; Kermit E. Olson, Tomahawk, Wis., and Philip E. Shick, Toledo, Ohio, assignors to Owens-Illinois, Inc.

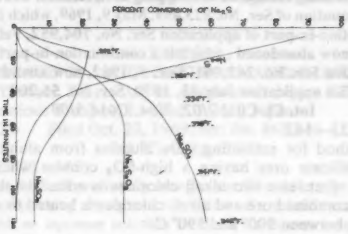
Filed Aug. 6, 1969, Ser. No. 847,966

Int. Cl. D21c *11/06*

U.S. Cl. 23—25 Q **5 Claims**

A process for the utilization of sulfur compounds in spent pulping liquors and flue gases, said process including the ox-

idation of neutral sulfite green liquor with air or oxygen under heat and pressure to form an alkaline solution containing sodium sulfate, sodium thiosulfate, sodium sulfite, sodium



hydroxide and sodium carbonate, suitable for recovery of sulfur dioxide from flue gases to obtain a product liquor suitable for use in a pulping process.

3,647,364

PROCESS FOR PRODUCING HIGH-PURITY SUBMICRON BARIUM AND STRONTIUM TITANATE POWDERS

Khodabakhsh S. Mazdiyasni, Xenia; Richard T. Dolloff, Dayton, both of Ohio, and Jonathan S. Smith, II, St. Louis, Mo., assignors to The United States of America as represented by the Secretary of the Air Force

Filed Jan. 6, 1970, Ser. No. 1,007

Int. Cl. C01g *23/00*

U.S. Cl. 23—51 R **5 Claims**

Barium titanate and strontium titanate powders having a particle size in the range of 50 to 150 angstroms and a purity of 99.75 percent or higher are prepared by the hydrolytic decomposition of a barium or strontium alcoholate and a titanium alcoholate. The barium and strontium titanate powders are useful in the preparation of dense ferroelectric bodies, thin film electronic components, and piezoelectric materials.

3,647,365

COARSE LIGHT SODIUM BICARBONATE

Walter C. Saeman, Hamden, Conn., assignor to Olin Corporation

Filed Jan. 6, 1970, Ser. No. 915

Int. Cl. C01d *7/10*

U.S. Cl. 23—64 **17 Claims**

Coarse, granular, free-flowing, dust-free, low-density sodium bicarbonate is prepared by hydrating light soda ash (sodium carbonate) to form particles of the desired final size, carbonating in the presence of free moisture to saturation, volatilizing the liberated moisture and recovering coarse, granular, free-flowing, dust-free, low-density sodium bicarbonate of the desired particle size. The sodium bicarbonate is produced in the novel form of hollow beads having apparent density as low as about 20 pounds per cubic foot.

3,647,366

PROCESS FOR THE PREPARATION OF ANHYDROUS ALUMINUM FLUORIDE

Theodorus J. Thoonen, Rotterdam, Netherlands, assignor to Verenigde Kunstmestfabrieken Mekog-Albatras N.V., Maliebaan, Utrecht, Netherlands

Continuation-in-part of application Ser. No. 634,859, May 1, 1967, now abandoned. This application Apr. 23, 1969, Ser. No. 818,785. Claims priority, application Netherlands, May 20, 1968, 6807108

Int. Cl. C01f *7/50*

U.S. Cl. 23—88 **13 Claims**

This disclosure is concerned with a process for the preparation of anhydrous aluminum fluoride, whereby an aqueous solution of ammonium fluoride is treated with at least approximately twice the quantity of an aluminum oxide required to form triammonium hexafluoroaluminate. The resulting intimate mixture of triammonium hexafluoroaluminate and unconverted aluminum oxide is separated from the mother liquor. The separated mixture is heated to decompose the triammonium hexafluoroaluminate to form aluminum fluoride. The anhydrous aluminum fluoride may be used as an auxiliary material in reducing aluminum oxide or as a catalyst in several chemical reactions.

3,647,367

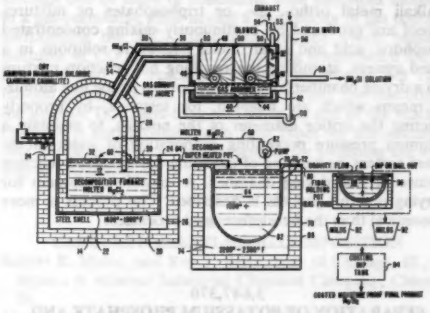
METHOD FOR MAKING ANHYDROUS MAGNESIUM CHLORIDE

James G. Macey, Salt Lake City, Utah, assignor to Pete Prestininni, Long Beach, Calif.; Ruth G. Macey and Ann M. Macey, part interest to each

Filed Dec. 29, 1969, Ser. No. 888,774

Int. Cl. C01f *5/30*; C01c *1/16*

U.S. Cl. 23—91 **3 Claims**



Anhydrous purified magnesium chloride is made from anhydrous ammonium carnallite in a specially adapted apparatus by decomposing the anhydrous ammonium carnallite in the substantial absence of contaminants, employing superheated molten magnesium chloride as the heating source, ammonium chloride vapor and molten magnesium chloride being recovered separately, and any residual magnesium oxide being precipitated from the molten magnesium chloride.

3,647,368

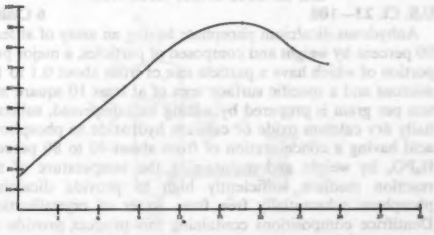
USE OF SODIUM CHLORIDE IN PROVIDING AQUEOUS SOLUTIONS OF COPPER SALTS FROM COPPER ORE

Jay W. Palmer, Crystal Lake, Ill., assignor to Morton-Norwich Products, Inc., Chicago, Ill.

Filed Apr. 9, 1970, Ser. No. 27,060

Int. Cl. C01g *3/04*

U.S. Cl. 23—97 **8 Claims**



A process for preparing aqueous solutions of copper salts from low-grade copper ores by admixing the ore with sodium

chloride, roasting the ore-sodium chloride admixture at an elevated temperature, extracting the roasted admixture with a leaching solution saturated with respect to sulfur dioxide and containing sodium chloride, and separating therefrom an aqueous solution containing a soluble copper salt. The solution of copper salt so prepared is suitable for further chemical processing to prepare a variety of copper salts or pure copper metal.

3,647,369

PROCESS FOR CONTINUOUSLY PRODUCING ALKALI METAL PHOSPHATES

Theodor Riehm, and Oskar Gehrig, both of Mannheim, Germany, assignors to Benckiser-Knapsack GmbH, Ludwigshafen am Rhine, Germany

Filed Aug. 6, 1968, Ser. No. 750,499
Claims priority, application Germany, Aug. 10, 1967, B 93910
Int. Cl. C01b *25/30*
U.S. Cl. 23—107 **5 Claims**

Alkali metal ortho-, di-, or triphosphates or mixtures thereof are produced by continuously mixing concentrated phosphoric acid and alkali metal hydroxide solutions in a closed system, atomizing the resulting hot reaction mixture into a drying chamber by means of nozzles or the like atomizing means which are adapted, for instance, by properly selecting the orifice diameter of the nozzles, to maintain a minimum pressure preventing evaporation of water in the closed system, and drying of calcining the atomized reaction mixture in said drying chamber. A suitable equipment for carrying out this process is described. The process is more economical than the heretofore used processes.

3,647,370

SEPARATION OF POTASSIUM PHOSPHATE AND ALUMINA

Robert A. Kearley, Corpus Christi, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 14, 1969, Ser. No. 807,438
Int. Cl. C01b *25/30;* **C01f** *7/34*
U.S. Cl. 23—107 **10 Claims**

Aqueous ammonia is employed to separate the phosphate content of a potassium aluminum phosphate as a solid phase. Typically, temperatures below 15° C. and ammonia concentration above 30 percent are relied upon.

3,647,371

METHOD FOR PREPARATION OF DICALCIUM PHOSPHATE

Keun Young Kim, and Kenneth J. Shaver, both of St. Louis, Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 7, 1968, Ser. No. 751,012
Int. Cl. C01b *25/32;* **A61h** *7/16*
U.S. Cl. 23—108 **6 Claims**

Anhydrous dicalcium phosphate having an assay of at least 90 percent by weight and composed of particles, a major proportion of which have a particle size of from about 0.1 to 1.0 microns and a specific surface area of at least 10 square meters per gram is prepared by adding well dispersed, substantially dry calcium oxide or calcium hydroxide to phosphoric acid having a concentration of from about 40 to 80 percent H_3PO_4 by weight and maintaining the temperature of the reaction medium sufficiently high to provide dicalcium phosphate substantially free from water of crystallization. Dentifrice compositions containing this product provide effective polishing action without undue abrasion. Such compositions are prepared by direct blending of conventional dentifrice ingredients with an aqueous paste containing 45 to 65 percent by weight anhydrous dicalcium phosphate.

3,647,372

METHOD OF RECOVERING ALUMINA FROM ALUNITE AND ALUMINOSILICATE MATERIALS

Jason Svoronos, Athens, Greece, assignor to Eleusis Bauxite Mines Mining Industrial & Shipping Inc., Athens, Greece

Continuation of Ser. No. 823,499, May 9, 1969, which is a **Continuation-in-part of application Ser. No. 704,952, Feb. 12, 1968, now abandoned , which is a continuation-in-part of application Ser. No. 242,061, Dec. 5, 1962, now abandoned. This application July 13, 1970, Ser. No. 56,200**
Int. Cl. C01f *7/02, 7/04;* **C01d** *5/00*
U.S. Cl. 23—142 **4 Claims**

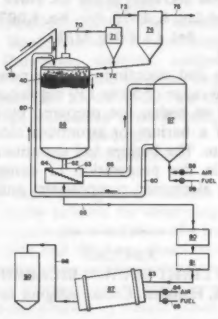
A method for extracting pure alumina from alunite and aluminosilicate ores having a high-SO_3 content wherein a mixture of at least two alkali chlorides is added to the ore and the combined ore and alkali chlorides is heated to a temperature between 500° and 590° C.

3,647,373

METHOD AND APPARATUS FOR CONVERTING ALUMINUM NITRATE SOLUTIONS TO ALPHA ALUMINA

Paul A. Huska, Carlisle; Herman P. Meissner, Winchester, and Thomas J. Lamb, Lexington, all of Mass., assignors to Arthur D. Little, Inc., Cambridge, Mass.

Filed Oct. 16, 1968, Ser. No. 768,111
Int. Cl. C01f *7/02, 7/08;* **C01b** *21/42*
U.S. Cl. 23—142 **11 Claims**



Method and apparatus for converting an aluminum nitrate solution to α-alumina for electrolytic reduction to aluminum. The solution is introduced into a fluidized bed under conditions which remove a substantial portion of the nitrate values as nitric acid vapor and form a solid product which is heated further to remove residual water and nitrate values and to convert the alumina to α-alumina.

3,647,374

METHOD FOR SEPARATING ALCOHOLS AND HYDRATED ALUMINA FROM HYDROLYSTS PRODUCTS OF ALUMINUM ALKOXIDES

Kazuhumi Nomura; Kunio Nakazato, and Hideki Matsui, all of Niihama-shi, Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

Filed Aug. 21, 1968, Ser. No. 754,486
Claims priority, application Japan, Aug. 29, 1967, 42/55686
Int. Cl. C01f *7/36;* **C07c** *29/12;* **B01d** *17/00*
U.S. Cl. 23—143 **8 Claims**

An improvement in a method for separating a hydrolysis product of an aluminum alkoxide into two layers of a higher alcohol layer and an aqueous layer containing readily precipitatable hydrated alumina in a suspended state. The hydrolysis reaction mixture is heated, either during or after the hydrolysis, at a temperature of 130°–250° C. in the presence of an ammonium, sodium or potassium salt of car-

bonic acid, hydrochloric acid, nitric acid, sulfuric acid, hydrobromic acid, phosphoric acid, formic acid, acetic acid or oxalic acid. The hydrated alumina is separated from the aqueous layer and the separated hydrated alumina is markedly low in content of impurities of organic matters.

3,647,375

METHOD OF PRODUCING MANGANESE DIOXIDE

Isao Tanabe, Tokyo, Japan, assignor to Japan Metals and Chemicals Company Limited, Tokyo, Japan

Filed Oct. 22, 1969, Ser. No. 868,644
Int. Cl. C01g *45/02*
U.S. Cl. 23—145 3 Claims

A method of producing manganese dioxide comprising the steps of pouring an aqueous solution of a soluble manganese salt and an aqueous solution of alkali carbonate into a reaction vessel and mixing the two solutions so that the two solutions may react with each other to produce manganese carbonate, heating the manganese carbonate produced in an atmosphere containing water vapor to produce crude manganese dioxide, and washing the crude manganese dioxide produced with dilute or concentrated nitric acid and then heating to produce manganese dioxide.

3,647,376

METHOD FOR PRODUCING CONCENTRATED NITRIC ACID

Tetsuya Ohrui, Niihama-shi, and Yasuhito Sakakibara, Saijo-shi, both of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

Filed May 16, 1969, Ser. No. 825,319
Int. Cl. C01b *21/40*
U.S. Cl. 23—160 4 Claims

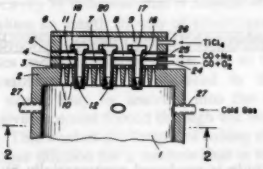
Subconcentrated nitric acid of 80–90 percent by weight is effectively concentrated to concentrated nitric acid of more than 97 percent by weight using an integrated tower where both stripping of nitrogen peroxide and distillation of subconcentrated nitric acid are carried out. Thus, concentrated nitric acid of more than 97 percent by weight which contains nitrogen peroxide is fed into the upper section of a tower and nitric acid of 80–90 percent by weight is fed into the lower section of the tower and distillation is effected, thereby obtaining concentrated nitric acid of more than 97 percent by weight from the middle stage of the tower.

3,647,377

PROCESS FOR THE MANUFACTURE OF FINE PARTICLE SIZE TITANIUM DIOXIDE BY REACTING TITANIUM TETRACHLORIDE WITH OXYGEN

Giovanni Hilgers, Post Bechen; Gerard Hitzemann, Post Durdorf, and Achim Kulling, Opladen, all of Germany, assignors to Titangesellschaft mbH, Leverkusen, Germany

Original application Aug. 29, 1968, Ser. No. 756,107, now Patent No. 3,586,489. Divided and this application May 27, 1970, Ser. No. 40,920
Int. Cl. C01g *23/04*
U.S. Cl. 23—202 V 5 Claims



The disclosure is of an improved method for producing a pyrogenic TiO 2 material by the vapor phase reaction of gaseous titanium tetrachloride with oxygen in the presence of hot gases produced by combustion of carbon monoxide and oxygen wherein all the oxygen required for the reaction is introduced in admixture with carbon monoxide, the gaseous $TiCl_4$ being introduced into the reaction chamber as one or more rotating jetstreams each surrounded by a mantle of gaseous carbon monoxide which reacts with the surrounding hot combustion gases plus free oxygen to produce a spatially fixed circular flame at a predetermined distance below the point of introduction of each rotating stream of gaseous $TiCl_4$ as a consequence of which the reaction of the gaseous $TiCl_4$ and free oxygen always takes place at substantially the same location, i.e., reaction zone in the reaction chamber and owing to the rotary movement of each $TiCl_4$ jetstream the reaction zone is relatively short as a consequence of which the residence time of the TiO_2 particles formed therein is short and of substantially equal duration thereby producing a uniform fine-grained product. The disclosure also includes apparatus for reacting the gaseous components in the manner hereinabove described wherein the gaseous $TiCl_4$ is introduced into the upper end of a reaction chamber through one or more of concentric tube feedpipes mounted in a gas-permeable plate having a multiplicity of gas passages surrounding the $TiCl_4$ feedpipes through which passages mixtures of CO and oxygen at reacting temperature are introduced into the reaction chamber to provide hot combustion gases plus free oxygen for effecting the reaction of the gaseous $TiCl_4$ and oxygen. The upper end of the reaction chamber is also provided with inlet pipes for introducing a cold gas tangentially into the chamber for sweeping the walls free of TiO_2 deposits.

3,647,378

CARBURETOR ANTI-ICING COMPOSITION

Robert E. Malec, and Roy J. Betty, both of Chicago, Ill., assignors to Armour Industrial Chemical Company, Chicago, Ill.

Continuation of application Ser. No. 533,246, Mar. 10, 1966, now abandoned. This application July 9, 1969, Ser. No. 847,776
Int. Cl. C10l *1/18, 1/22*
U.S. Cl. 44—70 2 Claims

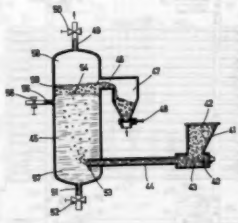
An enhanced carburetor deicer composition consisting of benzoic acid and a freeze-point depressant or a surfactant deicer.

3,647,379

METHOD OF GASIFYING WATER-CONTAINING COAL

Werner Wenzel, and Hermann Schenck, both of Aachen, Germany, assignors to Rheinische Braunkohlewerke A.G., Cologne, Germany

Filed Aug. 22, 1969, Ser. No. 852,430
Claims priority, application Germany, Aug. 22, 1968, P 17 96 050.8
Int. Cl. C10j *3/00, 3/46*
U.S. Cl. 48—202 9 Claims



For gasifying coal, a coal-water mixture is pumped in the form of a viscous mass into a treating chamber where the

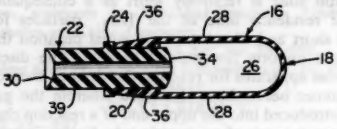
mixture is heated, causing, in immediately successive steps and in said chamber, first, dehydration of the mixture by vaporizing its water content, second, gasification thereof and, third, endothermic reaction of the products precedingly obtained by the heat treatment.

3,647,380

CONTACT LENS HOLDER

Robert E. Middleton, 5865 East Powers Ave., Englewood, Colo.

Filed Nov. 1, 1966, Ser. No. 591,167
Int. Cl. B24b *47/00*; B25b *11/00*; B66c *1/02*
U.S. Cl. 51—235 **6 Claims**



A contact lens holder including a tubular portion constructed for reversably mounting within said holder and which has one end thereof formed for complemental mating with a convex surface of a contact lens and the other end thereof formed for complemental mating with a concave surface of a contact lens. The contact lens holder includes a member having a relatively rigid portion formed adjacent the end of the holder upon which is to be mounted a contact lens to facilitate manipulating and positioning of said end of said holder.

3,647,381

DENTAL-PROPHYLAXIS COMPOSITION

Gabriel Reiter, 8204 Ventnor Ave., Margate City, N.J.

Filed Apr. 8, 1968, Ser. No. 719,732
Int. Cl. A61r *7/16*; B24d *3/02*
U.S. Cl. 51—308 **8 Claims**

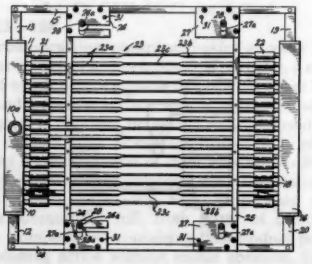
This invention is concerned with a dental-prophylaxis composition including particulate zirconium silicate having unique distribution of particle sizes.

3,647,382

GLASS FIBER COOLING MEANS MADE OF PALLADIUM

Kenneth B. Tilbrook, Kansas City, Mo., assignor to Certain-Teed Products Corporation, Ardmore, Pa.

Continuation of application Ser. No. 726,799, May 6, 1968, now abandoned , which is a division of application Ser. No. 583,623, Oct. 3, 1966, now Patent No. 3,392,779. This application June 15, 1970, Ser. No. 48,883
Int. Cl. C03b *37/02*
U.S. Cl. 65—12 **1 Claim**



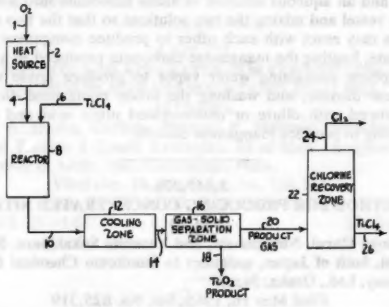
A cooling tube assembly for use with a molten glass bushing in the production of glass fibers wherein the cooling tubes of the assembly are fabricated from commercial grade palladium metal and are positioned in a highly corrosive, high-temperature environment.

3,647,383

METHOD FOR PRODUCING TITANIUM DIOXIDE

Alonzo Farmer, and John R. Bogdan, both of New Martinsville, W. Va., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Aug. 28, 1969, Ser. No. 853,671
Int. Cl. C01g *23/04*
U.S. Cl. 23—202 **8 Claims**



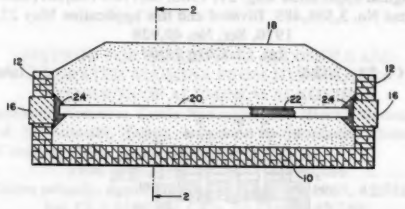
Pigmentary titanium dioxide is produced by vapor phase oxidation of titanium tetrachloride with oxygen at elevated temperatures in a reactor. Gaseous and solid products produced by the reaction are separated and chlorine recovered from the gaseous portion in a chlorine recovery zone. Operation of the chlorine recovery zone is improved by utilizing reactant oxygen having not more than about 100 parts per million nitrogen.

3,647,384

CORE FOR SILICON CARBIDE FURNACE

Jean-Marie Dessureault, Niagara Falls, Ontario, Canada, assignor to The Carborundum Company, Niagara Falls, N.Y.

Filed July 1, 1968, Ser. No. 741,739
Int. Cl. C01b *31/36*; B01j *6/00*; F27b *14/06*
U.S. Cl. 23—208 **7 Claims**

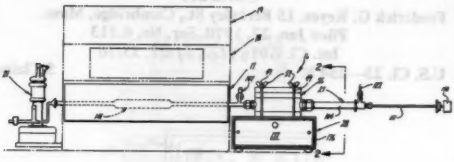


Silicon carbide is produced commercially by the reaction of carbon and silica in a carbon core electrical resistance furnace. According to the present invention, an improved core for such a furnace comprises a nonconductive combustible tube packed with carbon.

3,647,385
SOLID SAMPLER, APPARATUS AND METHOD

Thomas M. Stephens, Menlo Park, Calif., assignor to Dohrmann Instruments Company, Mountain View, Calif.

Filed Feb. 20, 1969, Ser. No. 800,946
Int. Cl. G01n *31/12, 31/16*
U.S. Cl. 23—230 PC 26 Claims

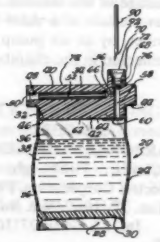


Solid sampler having a tray with a plurality of sample boats carried by the tray and containing samples to be analyzed with means for introducing the boats into a pyrolysis tube and removing the boats from the pyrolysis tube. The apparatus is a microcoulometric titrating system which includes the solid sampler combined with a pyrolysis furnace and a titration cell. The method involves the steps of utilizing the solid sampler in a microcoulometric titration system for reductive-type analyses and oxidative-type analyses.

3,647,386
SAMPLE PROCESSING CONTAINER

Saul R. Gilford, Oberlin, Ohio, assignor to Gilford Instrument Laboratories, Inc., Oberlin, Ohio

Continuation-in-part of application Ser. No. 793,504, Jan. 23, 1969, now abandoned. This application Sept. 26, 1969, Ser. No. 864,945
Int. Cl. G01n *1/10*; G01n *21/02*; B65d *32/00*
U.S. Cl. 23—230 R 29 Claims



A sample processing container, especially for use with samples of some fluid such as blood or blood serum contained in a short length of capillary tubing. The container comprises a flexible plastic bag having its lower end closed and having its upper end sealed to a relatively rigid header. The length of capillary tubing is arranged to be inserted into an elongate cavity or chamber that is formed in the center of the header along its length by way of an entrance at one end of the header. The opposite end of the cavity or chamber communicates with the interior of the bag so that when the length of capillary tubing is disposed in the cavity or chamber, a nozzle may be inserted into the entrance and diluent of a given amount forced through the length of tubing into the bag. This washes the length of tubing clean and provides the proper dilution for a mixture that is to be sampled. The entrance is plugged or, in the alternative, there is a valve in the connection between the header cavity or chamber and the bag that prevents reverse flow out of the bag. The bag can be shaken or kneaded manually or mechanically to assure homogeneity of the sample.

A normally blocked entrance to the bag through the top of the header enables sample to be removed by a hollow needle or snorkle for testing as desired.

In the alternative, an independent lateral passageway is provided in the header for withdrawing a sample by a dip tube. A second valve is provided at the lower end of the independent passageway at the bottom of the header to prevent reverse flow out of the bag.

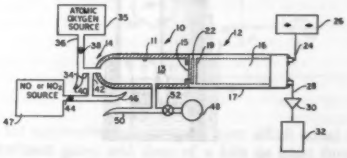
The header may have a slot, either open or closed for insertion of an identifying label that will be carried with the container.

The header may be constructed for mounting on a suitable carrier, so that a plurality may be handled, stored, and viewed together.

3,647,387
DETECTION DEVICE

Sidney W. Benson; Gilbert R. Haugen, both of Palo Alto, and Roland S. Jackson, San Jose, all of Calif., assignors to Stanford Research Institute, Menlo Park, Calif.

Filed Mar. 19, 1970, Ser. No. 20,919
Int. Cl. G01n *27/68*
U.S. Cl. 23—232 R 13 Claims

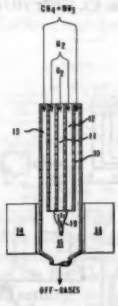


The presence of nitrogen containing compounds is detected by sampling vapor in the vicinity of the suspected compounds, reacting the vapor under conditions to convert the compound to nitric oxide. The nitric oxide is reacted with atomic oxygen with the chemiluminescent emission of light. This light is detected to determine the presence of the suspected compound.

3,647,388
PROCESS FOR THE MANUFACTURE OF HYDROGEN CYANIDE

John Derek Rushmere, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed May 4, 1970, Ser. No. 34,119
Int. Cl. C01c *3/02*; B01j *1/00*
U.S. Cl. 23—151 13 Claims



A process for the manufacture of hydrogen cyanide from a gaseous hydrocarbon of up to six carbon atoms such as methane and ammonia is provided in which the gaseous

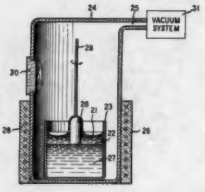
hydrocarbon and ammonia react in a reaction zone at the flame front of a flame formed by the combustion of hydrogen with oxygen. The preferred process is carried out in a burner having a center conduit for the flow of an oxygen-bearing stream and one or more annular conduits adjacent the center conduit for the cocurrent flow of hydrogen, ammonia and the gaseous hydrocarbon, the conduits ending in a reaction chamber where the gaseous hydrocarbon and ammonia react at the flame front of the hydrogen and oxygen combustion flame.

3,647,389

METHOD OF GROUP III-V SEMICONDUCTOR CRYSTAL GROWTH USING GETTER DRIED BORIC OXIDE ENCAPSULANT

Martin Eric Weiner, Bridgewater Township, Somerset County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed May 11, 1970, Ser. No. 36,367
Int. Cl. C01b *27/00*; B01d *9/00*
U.S. Cl. 23—204 R **5 Claims**



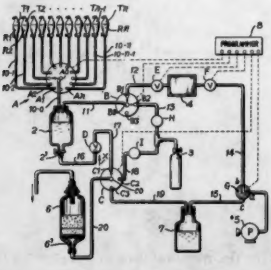
The impurity content of boric oxide for use as the encapsulant in the growth of crystals of Group III–V semiconductors by the liquid encapsulation technique is reduced by a high-temperature chemical treatment. The boric oxide is maintained for a time together with a getter substance under vacuum at a temperature at which both are molten. When the growth of crystals of GaAs and GaP is contemplated, some suitable getter substances are boron-palladium alloy, boron-platinum alloy and the pure metals or alloy combination of gallium, aluminum and silicon.

3,647,390

APPARATUS FOR SYNTHESIS OF PEPTIDES OR THE LIKE ORGANIC COMPOUNDS

Toshiya Kubodera; Tasuku Hara, and Hideki Makabe, all of Kyoto, Japan, assignors to Shimadzu Seisakusho Ltd., Kyoto, Japan

Filed July 3, 1969, Ser. No. 838,960
Claims priority, application Japan, July 8, 1968, 43/48048
Int. Cl. C07c *103/52*
U.S. Cl. 23—252 R **7 Claims**



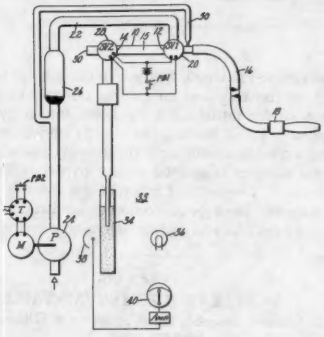
An apparatus for synthesis of peptides or the like organic compounds, in which transfer of the selected reagents into and out of a reaction vessel is conducted by utilizing vacuum and a pressurized inert gas under control of various valves. No liquid pumps are required. The sequential operation of the valves may be automatically controlled by a programmer.

3,647,391

BREATH ANALYZING APPARATUS HAVING MEANS FOR EVAPORATING MOISTURE FROM BREATH CONDUIT

Frederick G. Keyes, 15 Berkeley St., Cambridge, Mass.

Filed Jan. 27, 1970, Ser. No. 6,113
Int. Cl. G01n *1/22, 31/22, 33/16*
U.S. Cl. 23—254 R **5 Claims**



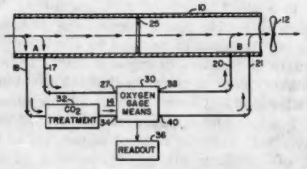
Apparatus for analyzing breath for ethyl alcohol having a breath conduit into which a subject expires in the collection of a sample of breath is provided with means for removing condensed moisture from the conduit. For this purpose, means is provided for supplying air to the conduit following the collection of a sample thereby effecting a flow of drying gas through the passage of the conduit. Advantageously, the air is supplied, after closure of a valve between the conduit and a sample chamber, by an air pump which also serves to expel the sample collected in the chamber to alcohol measuring means.

3,647,392

CARBON DIOXIDE SENSOR

Gerald E. McGinnis, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 27, 1967, Ser. No. 612,119
Int. Cl. G01n *27/50*
U.S. Cl. 23—254 E **7 Claims**



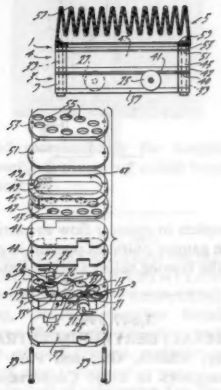
The carbon dioxide in a sample of gas to be tested is reacted with potassium superoxide resulting in a related increase of oxygen. The increase in oxygen over that of the original sample is determined in a differential oxygen gauge which compares the partial pressure of oxygen in the original sample with the partial pressure of oxygen in the modified sample including the increased amount of oxygen from the reaction.

3,647,393

GAS-GENERATING APPARATUS

Maurice B. Leising, Clawson; Herman J. Greif, Jr., Orchard Lake; James R. Kirberg, Walled Lake, and Philip J. Willson, Royal Oak, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed May 11, 1970, Ser. No. 36,020
Int. Cl. B01j 7/00
U.S. Cl. 23—281 3 Claims



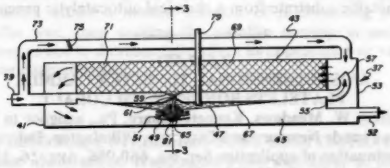
Gas generator having a folded inflatable bag connected thereto, the generator having a plurality of pockets confining propellant. Electrical ignition devices ignite the propellant in two pockets first to release gas for deploying or partially expanding the folded bag. Propellant filled channels connect the two initially ignited propellant pockets to the remaining pockets for igniting the latter to release gas for inflating the bag to a desired pressure. A sublimable, vaporizable or decomposable powdered material capable of absorbing heat is provided in the device to absorb the heat produced by the burning propellant.

3,647,394

MUFFLER DEVICE FOR REMOVING IMPURITIES

Joseph R. Wetch, Sherman Oaks; Seymour Sudar, Malibu, and Louis L. Bienvenue, Canoga Park, all of Calif., assignors to North American Rockwell Corporation

Filed Feb. 20, 1970, Ser. No. 13,247
Int. Cl. F01n 3/16
U.S. Cl. 23—288 F 14 Claims



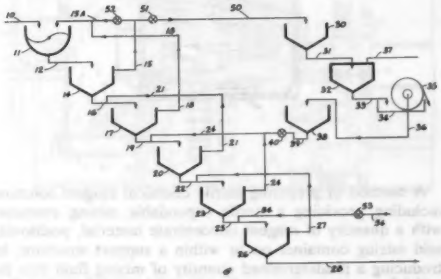
A muffler, scrubber or chemical reactor device for utilization with combustion engines to aid in the removal of impurities from exhaust gases, comprising a housing having a packing therein, an inlet line to said housing for conducting the exhaust gas from said engine thereto, a construction such as a venturi within the inlet line through which exhaust gas will pass, means for aspirating a reactant material into the exhaust gas near the venturi throat and for utilizing the thermal energy of the exhaust gas for liquefaction of materials where needed, an outlet from the housing, and a cooled bypass line ahead of and around the orifice or venturi to provide temperature and pressure control in and across the device.

3,647,395

RECOVERING ALKALI METAL SALTS FROM CEMENT KILN GASES BY THE STEPS OF CONDENSING LEACHING AND CRYSTALLIZING

Thomas Stanley Dean, Ragland, Ala.

Filed Oct. 21, 1968, Ser. No. 769,110
Int. Cl. B01d 9/02, 11/02
U.S. Cl. 23—299 4 Claims



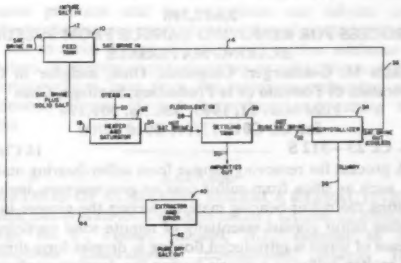
Method for recovering substantially pure alkali metal salts from the exhaust gases and dust of a kiln or blast furnace comprising leaching said alkali metal salts from the exhaust gases and dust, concentrating same and precipitating out substantially pure alkali metal salts.

3,647,396

PRODUCTION OF HIGH-PURITY SALT

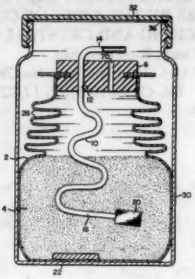
H. W. DeWittie, Waverly, Pa.; John A. Kirchstein, Cleveland, Ohio, and Kishore M. Atit, Dalton, Pa., assignors to International Salt Company, Clarks Summit, Pa.

Filed Feb. 25, 1969, Ser. No. 801,938
Int. Cl. C01d 3/14; C01f 11/46
U.S. Cl. 23—299 6 Claims



Recrystallization of sodium chloride in the form of high-purity cubic crystals from a sodium chloride source containing calcium sulphate impurity by multieffect evaporation preceded by treatment of the hot sodium chloride saturated brine by flocculents and settling, to cause the undissolved calcium sulphate particles and any other suspended solids to agglomerate and settle out of the brine prior to recrystallization of the sodium chloride. The conventional requirement for filtering the hot brine is completely eliminated.

3,647,397
REAGENT SOLUTION PREPARATION
Charles M. Coleman, 958 Washington Road, Pittsburgh, Pa.
Filed Nov. 19, 1969, Ser. No. 878,066
Int. Cl. B01f *1/00*; B01d *11/02*
U.S. Cl. 23—309 **7 Claims**

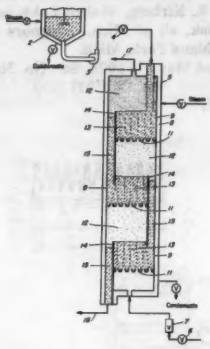


A method of preparing sterile chemical reagent solutions including providing a sterile expandable mixing container with a quantity of reagent concentrate material, positioning said mixing container on or within a support structure, introducing a predetermined quantity of mixing fluid into the mixing container, mixing the concentrate material and fluid to establish a uniform homogeneous reagent solution and subsequently filtering the solution to remove particulate material. Mixing may be effected by an inertly covered magnetic stirring element positioned within the container.

A sterile container assembly for chemical reagent concentrates including an expandable inner container having a chemical reagent concentrate therein, closure means having a passageway therethrough secured to the mouth of said inner container, a tubular reagent discharge conduit having one portion extending into the closure passageway and one end disposed within the container. Filter means secured to said conduit and an outer container protectively surrounding said inner container. Sterile sealing means on at least one of said inner and outer containers to prevent communication between the surrounding air and the interior of the inner container.

3,647,398
PROCESS FOR REMOVING GANGUE FROM SULFUR-BEARING MATERIALS
William M. Goldberger, Columbus, Ohio, assignor to Corporation de Fomento de la Production, Santiago, Chile
Filed Mar. 21, 1969, Ser. No. 809,194
Int. Cl. C01b *17/14*; B01d *12/00*
U.S. Cl. 23—312 S **14 Claims**

A process for removing gangue from sulfur-bearing materials, such as silica from sulfur ores or concentrates, includes melting the sulfur-bearing material having the gangue in the molten sulfur consist essentially of minute solid particles. A stream of water is introduced flowing in droplet form through the molten sulfur as a matrix having the droplets coalesce in the effluent of the stream exteriorly of the molten sulfur. Quantities of the minute gangue particles are carried off from the molten sulfur by the action of the water droplets which wet the gangue and cause the gangue to be brought to the sulfur-water interface, and by maintaining the flow rate of the coalesced water exteriorly of the molten sulfur within a range of velocities sufficient to load the coalesced water with quantities of minute gangue particles and entrain these particles in the effluent water stream. In preferred embodiments the molten sulfur is caused to flow countercurrently to the droplets of water passing through the molten sulfur such as through having the sulfur follow a downward course while the water droplets are ascending in the sulfur. Also, in certain preferred embodiments the molten sulfur is subjected to



flowing water droplets in counter flow as carriers for quantities of the minute gangue particles present in each of a series of regions along the flowing sulfur and the water stream.

3,647,399
DI (ALKALI METAL) BERYLLIUM TETRAHYDRIDES
Eugene C. Ashby, Atlanta, Ga., and Paul Kobetz, Baton Rouge, La., assignors to Ethyl Corporation, New York, N.Y.
Filed Sept. 10, 1964, Ser. No. 395,985
Int. Cl. C01b *6/24*
U.S. Cl. 23—360 **13 Claims**

Novel alkali metal beryllium hydrides of the formula M_2BeH_4, wherein M is alkali metal, are prepared by reaction of alkali metal aluminum alkyl hydrides with beryllium alkyls wherein the alkyl groups contain not more than about 10 carbon atoms. The new compounds are effective reducing components for high-energy fuels.

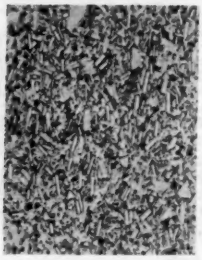
3,647,400
MAGNETIC ARTICLES
Joseph Louis Blanchard, Saint-Joseph, France, assignor to Compagnie Internationale Poure L'Informatique, Les Clayes-sous-Bois, France
Filed Mar. 10, 1969, Ser. No. 805,859
Claims priority, application France, Mar. 26, 1968, 145354
Int. Cl. B32b *15/00*
U.S. Cl. 29—191 **8 Claims**

A thin magnetic layer of substantially rectangular hysteretic cycle, specially for use in binary data information magnetic stores, comprised of a ternary alloy of cobalt, tungsten and phosphor. Such a layer is produced on a dielectric or metallic substrate from a chemical autocatalytic process.

3,647,401
ANISODIMENSIONAL TUNGSTEN CARBIDE PLATELETS BONDED WITH COBALT
Geoffrey W. Meadows, Kennett Square, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
Continuation of application Ser. No. 660,986, Aug. 16, 1967, now Patent No. 3,451,791, which is a continuation-in-part of application Ser. No. 582,924, Sept. 29, 1966, now abandoned , and a continuation-in-part of 516,825, Nov. 24, 1965, now abandoned ; said 582,924, , Continuation-in-part of application Ser. No. 516,825, , which is a continuation-in-part of application Ser. No. 418,808, Dec. 16, 1964, now abandoned. This application June 4, 1969, Ser. No. 830,323
Int. Cl. C22c *29/00*
U.S. Cl. 29—182.8 **1 Claim**

Anisodimensional tungsten carbide platelets having a maximum dimension of from 0.1 to 50 microns and a minimum

dimension of less than one-third the maximum dimension are prepared by heating an intimately mixed uniformly fine cobalt/tungsten carbide powder to a temperature above



1,300° C. and recrystallizing the tungsten carbide. The platelets are useful in preparing cobalt bonded tungsten carbide cutting tools.

3,647,402

GALVANICALLY METALLIZED OBJECTS HAVING A POST-CHLORINATED POLYETHYLENE SUBSTRATE AND PROCESS OF PRODUCING SAME

Robert Buning, Oberlar; Gunther Bernhardt, Hangelar, Vilicher; Egon Bierwirth, Oberlar, and Werner Trautvetter, Spich, all of Germany, assignors to Dynamit Nobel AG, Troisdorf, near Cologne, Germany

Continuation-in-part of application Ser. No. 752,738, Aug. 15, 1968, now abandoned. This application Oct. 8, 1968, Ser. No. 765,963

Claims priority, application Germany, Oct. 13, 1967, D 54342

Int. Cl. C23b *5/60*

U.S. Cl. 29—195 **8 Claims**

Galvanically metallized thermoplastic shaped articles comprising post-chlorinated polyethylene or mixtures thereof with polyvinyl chloride and/or post-chlorinated polyvinyl chloride.

3,647,403

SOLID FUEL UNIT

George B. Davis, Jr., 7512 Marbury Road, Bethesda, Md.

Continuation-in-part of application Ser. No. 803,484, Feb. 28, 1969, now abandoned. This application Aug. 14, 1970, Ser. No. 63,899

Int. Cl. C10l *9/00, 11/00*

U.S. Cl. 44—6 **4 Claims**

A process for improving the initial igniting properties of a charcoal unit by first impregnating the unit with an inflammable liquid after the temperature of the liquid and charcoal has first been established at a predetermined value and thereafter sealing the liquid within the unit by dipping the latter within a molten solution of high-melting point paraffin wax, then cooling the paraffin coating in such a manner as not to detrimentally affect its appearance or vapor sealing characteristics.

3,647,404

THERMALLY STABLE JET FUEL COMPOSITION

William M. Sweeney, Wappingers Falls, and Jerzy J. Bialy, Lagrangeville, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed May 7, 1969, Ser. No. 822,734

Int. Cl. C10l *1/16, 1/22*

U.S. Cl. 44—62 **9 Claims**

Thermally stable turbine or jet fuel composition containing (1) a hydrocarbon polymer of ethylene and a C_3 to C_4 olefin and optionally a higher olefin and (2) an aldehyde-amine condensation product, and a method for operating a turbine engine.

3,647,405

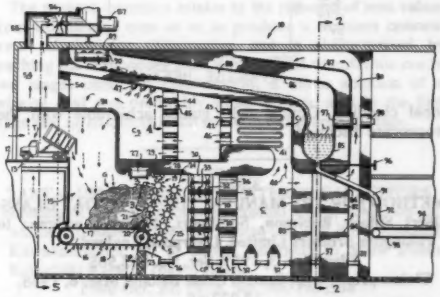
GARBAGE INCINERATOR AND METHOD OF OPERATION

Ray F. Smith, 25 South Ogontz, York, Pa.

Filed Dec. 12, 1969, Ser. No. 884,471

Int. Cl. C03b *19/02*

U.S. Cl. 65—19 **45 Claims**



A system for disposing of garbage and gaining useful heat output from controlled burning of the garbage is provided and is particularly adapted for decentralized locations in a community. The garbage is dumped into a feed hopper and piled to a substantial depth with the forward face of substantial cross-sectional area being acted upon by rotating shredders; the garbage being continuously fed forward by the endless belt support at the bottom of the hopper. A second series of shredders serves to completely shred and masticate the garbage into fine particles and project the same into a combined compressing and pulverizing station. Continuous ignition is provided by a heat-retaining wall immediately downstream. Solid particles, glass and metal are removed by transverse conveyors at critical locations along the system. Computer control of the operating components and auxiliary fuel injection maintains full efficiency in the incinerator chamber. Heat exchange means is provided for useful heat output with expansion and scrubber chambers immediately downstream thereof. Steam is injected to move the relaxed gaseous products and to precipitate out minute solid products; the gaseous products being forced to the bottom of the unit to assist the precipitation and to thus minimize air pollution. A melting cupola for glass or other thermoplastic material receives heat from the incinerator chamber with continuous casting of such byproducts and cutting into blocks.

3,647,406

METHOD OF ACHIEVING SURFACE REFRACTIVE INDEX CHANGES IN A GLASS LIGHT GUIDE ELEMENT

George M. C. Fisher, Homdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

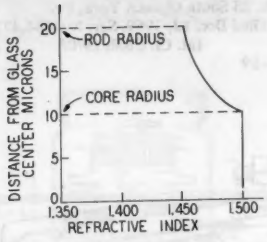
Filed Nov. 4, 1968, Ser. No. 772,970

Int. Cl. C03c *15/00;* **F16c** *1/06;* **G02b** *5/14*

U.S. Cl. 65—30 **3 Claims**

The surface index of refraction of a light-guiding glass is controllably increased or decreased by changing the alkali metal ion concentration at the surface. In one approach, these ions are replaced with similar ions of differing ionic radius. A gaseous source of replacement ions and capable of extracting the surface ions is passed over the glass surface at temperatures sufficient to permit an ion diffusion inward. Control of the process parameters permits regulating the

exchanged ion layer depth and approximating a definite refractive index gradient, which is not possible with conventional cladding. Optical light guides achievable with the process are disclosed.

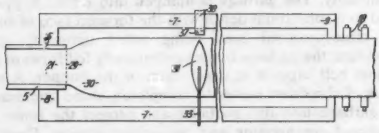


3,647,407

METHOD FOR THE MANUFACTURE OF FLOAT GLASS

Albert Sidney Robinson, Southport, England, assignor to Pilkington Brothers Limited, Liverpool, England

Filed Mar. 3, 1969, Ser. No. 803,565
Claims priority, application Great Britain, Mar. 6, 1968, 10,937/68
Int. Cl. C03b *18/00*
U.S. Cl. 65—30 **1 Claim**



Glass having a shaded characteristic, for example a shaded windscreen, is manufactured by maintaining a body of molten material for modifying the glass against a surface of the moving glass and controlling variation in the treatment of the glass in a lateral direction with respect to the direction of movement. The method involves the provision of a locating member which is shaped to maintain the molten body with a configuration in which its dimension in the direction of glass advance is widest at its center and tapers toward both its ends. The glass is subsequently cut longitudinally through its center to produce a pair of shaded component glass ribbons.

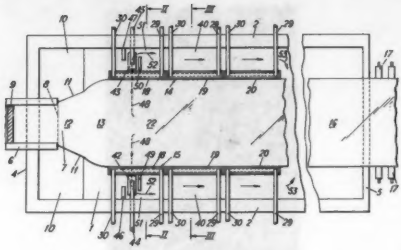
3,647,408

METHOD AND APPARATUS FOR MANUFACTURE OF FLOAT GLASS

George A. Dickinson, St. Helens, England, assignor to Pilkington Brothers Limited, Liverpool, England

Filed July 29, 1969, Ser. No. 845,681
Claims priority, application Great Britain, Aug. 12, 1968, 38,561/68
Int. Cl. C03b *18/00*
U.S. Cl. 65—99 A **7 Claims**

Thick float glass, e.g., from 8 mm. to 30 mm. thick, is produced by physically halting the lateral flow of the glass when it achieves a predetermined thickness, the layer of molten glass being thermally controlled by causing transverse flow of molten metal beneath the glass and then confining to the sides of the bath downstream flow of that molten metal and permitting dispersal of the confined flows of molten metal into a downstream region of the bath. This method is accomplished by a float glass apparatus having longitudinally extending fenders, the section nearer the entrance being spaced from the floor so a pump may pump liquid in the bath transverse to the sheet of glass being formed.

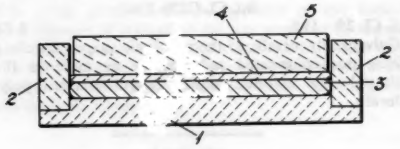


3,647,409

METHOD AND APPARATUS FOR HEAT TREATING GLASS SHEETS ON MOLTEN METAL

Bernard Long, Paris, France, assignor to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Sept. 23, 1969, Ser. No. 860,201
Claims priority, application France, Sept. 24, 1968, 167,397
Int. Cl. C03b *25/02*
U.S. Cl. 65—117 **15 Claims**



Removing defects in surface planimetry from a glass sheet by depositing the sheet on a layer of molten metal which it does not wet within a mold of corresponding interior configuration. A uniform pressure greater than that necessary to maintain in equilibrium a thickness of liquid glass equal to the thickness of the sheet is applied to its upper surface by a plate or second layer of molten metal not wetted by the glass, and the sheet is heated to give is a viscosity between 10^8 and 10^7 C.G.S. units. After the defects are eliminated by the action of surface tension, the confining layers are cooled so as to cool the sheet. By rapidly cooling the confining layers, the sheet can also be tampered.

3,647,410

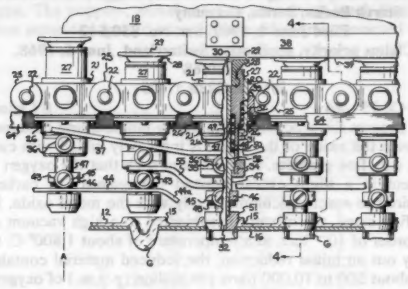
GLASS RIBBON MACHINE BLOW HEAD MECHANISM

Richard A. Heaton, Toledo, and Maurice J. Sachs, Aurora, both of Ohio, assignors to Owens-Illinois, Inc.

Filed Sept. 9, 1969, Ser. No. 856,289
Int. Cl. C03b *5/32, 9/14*
U.S. Cl. 65—184 **4 Claims**

A blow head mechanism for a glass ribbon type forming machine in which the improved blow head structure and the method of operation thereof employs complete cammed movements for manipulation of the blow shoe and blowpipe, respectively, into and out of engagement with the overlying blowbox and the underlying glass ribbon, the latter moving horizontally with the series of chainlike orifice plates. The positive control of both axially movable members of the

chainlike series of blow heads on the machine enables reliable repeatibility of the blowing cycle in making successive ar-



ticles from the ribbon, and, thereby improves quality of the glassware produced.

3,647,411

PACKAGED COMPOSITION FOR ENHANCING THE GROWTH OF PLANTS

George D. Stevens, Marinette, Wis.
Continuation-in-part of application Ser. No. 856,230, Aug. 4, 1969, now Patent No. 3,532,485, which is a continuation-in-part of application Ser. No. 609,709, Dec. 27, 1969, now abandoned. This application Apr. 2, 1970, Ser. No. 25,281

Int. Cl. C05d 7/00; B65d 83/00
U.S. Cl. 71—1 6 Claims

A packaged composition for enhancing the growth of plants provides pressurized discharge of a plant nutrient solution for application to the foliage of plants. The solution contains a large quantity of dissolved CO_2 and is expelled from the container by CO_2 at above atmospheric pressure.

3,647,412

PROCESS FOR PRODUCING AMMONIUM NITRATE, CALCIUM CARBONATE MIXED FERTILIZER PRILLS AND RESULTING PRODUCT

Marion L. Brown, Jr.; Albert W. Green, and Elmer L. Blanton, all of Yazoo City, Miss., assignors to Mississippi Chemical Corporation, Yazoo City, Miss.

Filed June 20, 1969, Ser. No. 835,213
Int. Cl. C05c 1/02
U.S. Cl. 71—59 2 Claims

Particulate ammonium nitrate, calcium carbonate mixed fertilizer compositions are rendered more resistant to caking, less hygroscopic and less sensitive to crystal-type transitions and less free ammonia is formed during their production by the addition of 0.1 to 0.2 percent by weight diammonium phosphate, 0.068 to 0.135 percent by weight boric acid or an ammonium or alkali metal salt thereof, and 0.005 to 0.01 percent ammonium sulfate to the molten or aqueous ammonium nitrate prior to the addition of finely divided calcium carbonate.

3,647,413

ALKYL-N-ALKYL-CHLOROPHENOXYTHIOACETIMIDATES AS SELECTIVE HERBICIDES

Edmund J. Rumanowski, Dover, N.J., assignor to Allied Chemical Corporation, New York, N.Y.

Filed July 3, 1969, Ser. No. 839,078
Int. Cl. A01n 9/12
U.S. Cl. 71—98 6 Claims

Alkyl-N-alkyl-chlorophenoxythioacetimidates are prepared by reacting N-alkyl-di- or trichlorophenoxythioacetamide with alkyl iodide in the presence of sodium alcholate. The compounds are useful as herbicides.

3,647,414

EXTRACTION OF IRON FROM TITANIFEROUS ORES

Arnold E. Nilsen, Freehold, N.J., assignor to N L Industries, Inc., New York, N.Y.

Filed July 31, 1969, Ser. No. 846,343
Int. Cl. C22b 3/00, 53/00
U.S. Cl. 75—1 11 Claims

The present invention relates to the removal of iron values from titaniferous ores so as to produce a titanium concentrate suitable for chlorination and is characterized by leaching the iron values from a metallized titaniferous ore in two stages using, in combination, a dilute solution of a mineral acid and preferably waste sulfuric acid in the first stage and an oxidizing leach solution in the second stage.

3,647,415

TANTALUM POWDER FOR SINTERED CAPACITORS

Tomosaburo Yano, Yokohama; Naoaki Oishi, Ichikawa-shi; Akitoshi Komatsu, Aizuwakamatsu-shi, and Keizi Koyama, Kawanuma-gun, all of Japan, assignors to Show Denko Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 21, 1968, Ser. No. 769,366
Claims priority, application Japan, Oct. 25, 1967, 42/68318
Int. Cl. B22f 9/00
U.S. Cl. 75—0.5 BB 5 Claims

Tantalum powder for electrolytic capacitors wherein tantalum particles in said powder have an average flakiness of 2 to 60, at least 80 percent by weight of said powder consisting of particles having a shorter breadth of 3 to 250μ and said powder being free from particles having a shorter breadth of above 500μ, and methods of preparing the same.

3,647,416

SLOW-RELEASE FERTILIZER SPIKE HAVING HIGH CRUSH-RESISTANCE

Henry C. Messman, Mamaroneck, N.Y., assignor to Edmond L. d'Ouville, Evergreen Park, Ill., a part interest

Filed July 18, 1969, Ser. No. 842,946
Int. Cl. C05c 9/02
U.S. Cl. 71—29 4 Claims

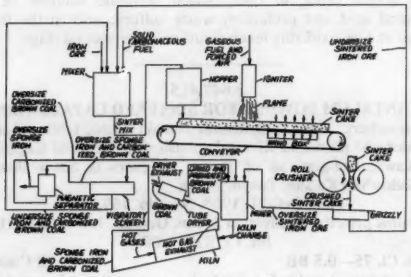
A slow-release fertilizer composition, having a crushing strength in excess of 2,000 p.s.i., comprises a water-soluble urea-formaldehyde resin, a granular filler material and a binder derived from magnesia and phosphoric acid. The composition is prepared as a paste and extruded in the form of a beveled spike.

3,647,417

PROCESS FOR PRODUCING SPONGE IRON

Rolf Emil Wetzel, Essen, and Willi Janssen, Mulheim (Ruhr), both of Germany, assignors to Fried Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Sept. 4, 1969, Ser. No. 855,278
Claims priority, application Germany, Sept. 7, 1968, P 17 58 951.4
Int. Cl. C21b *13/14*
U.S. Cl. 75—35 5 Claims



Fine sponge iron particles are mixed with iron ore and the mixture is then sintered before being charged to a kiln for reduction into sponge iron.

3,647,418

HIGH RECOVERY PRODUCTION OF RICH FENI ALLOYS IN A CONVERTER

Lucas S. Moussoulos, 1, Tsacalof St., Athens (136), Greece

Filed Dec. 9, 1965, Ser. No. 512,806
Claims priority, application Greece, Dec. 11, 1964, 27418
Int. Cl. C22b *23/00*; C22c *3/00*
U.S. Cl. 75—82 2 Claims

A method of producing nickel rich iron alloy by increasing the nickel concentration of the alloy in a converter having molecular-oxygen containing gas olowing comprising adding nickel-bearing iron ore and molecular oxygen containing gas to the converter at a rate which maintains the temperature in the converter between 1,550° and 1,650° C., carrying out the blowing and addition of ore in a plurality of steps, and removing, after each step, the slag produced at each step of blowing with addition of ore so that the weight of the slag removed after each step is smaller than four times the weight of the alloy produced after the end of the corresponding step of blowing and addition of ore.

3,647,419

NICKEL RECOVERY

John K. Pargeter, Warwick, N.Y., and Loris M. Diran, Montclair, N.J., assignors to The International Nickel Company, Inc., New York, N.Y.

Filed Dec. 31, 1969, Ser. No. 889,726
Int. Cl. C22b *23/00, 7/00, 5/04*
U.S. Cl. 75—82 5 Claims

The nickel content of nickel-magnesium alloy fines containing up to 50 percent silicon is recovered in usable metal form by reacting said fines exothermically with powdered iron oxide, an alkali metal nitrate and magnesia fluxing ingredients to provide a nickel-containing metal phase and a fluid magnesia-containing slag phase.

3,647,420

PROCESS FOR PRODUCING HIGH-PURITY NIOBIUM AND TANTALUM

Attilio Restelli, Binningen, Switzerland, assignor to Hermann C. Starck Berlin, Berlin, Germany

Filed June 4, 1969, Ser. No. 830,542
Claims priority, application Switzerland, June 6, 1968, 8380/68
Int. Cl. C22b *51/00*
U.S. Cl. 75—84 8 Claims

A process for producing high-purity niobium and tantalum wherein the oxide of the metal is intimately mixed with carbon, e.g., fine graphite, in an amount such that the oxygen is present in a slight excess beyond the quantity of carbon required to react stoichiometrically with the metal oxide. In the first stage, the mixture is subjected to a high vacuum at the order of 10^{-4} torr. at a temperature of about 1,800° C. to carry out an initial reduction, the reduced material containing about 500 to 10,000 parts per million (p.p.m.) of oxygen. In an intermediate stage, the partly reduced product is combined with finely divided carbon pyrolytically precipitated from a hydrocarbon in a retort permeable to hydrogen (at elevated temperature), so that the carbon is uniformly distributed over the surface of the partly reduced product. In the second state, the mixture of the partially reduced product and the finely divided pyrolytically precipitated carbon is subjected to a temperature below to 2,000° C. and nevertheless sufficient to effect a final reduction. Preferably the latter temperature is about 1,700° C. The resulting high-purity metal (i.e., tantalum or niobium), may be used in electrolytic capacitors.

3,647,421

REPROCESSING A PLUTONIUM DIOXIDE-MOLYBDENUM FUEL

Paul A. Nelson, Wheaton, Ill., and Donald A. Wenz, Livermore, Calif., assignors to The United States of America as represented by the United States Atomic Energy Commission

Filed Apr. 4, 1969, Ser. No. 813,733
Int. Cl. C22b *61/04*
U.S. Cl. 75—84.1 A 7 Claims

Plutonium is recovered from an oxidation-resistant plutonium dioxide-molybdenum fuel by reacting the fuel with molten cupric chloride contained in a molten salt to form a soluble plutonium species, an insoluble molybdenum species and a volatile molybdenum species. Plutonium is reduced and separated from the cupric chloride by mixing the salt with a zinc-magnesium or a cadmium-magnesium alloy which is thereafter retorted to leave essentially pure plutonium metal.

3,647,422

RECOVERY OF SILVER, POLYESTER AND AMINO ACIDS FROM PROCESSED FILM

Eugene Wainer, Shaker Heights, Ohio, assignor to Horizons Incorporated, a Division of Horizons Research Incorporated

Filed July 13, 1970, Ser. No. 54,092
Int. Cl. C22b *3/00, 11/00*
U.S. Cl. 75—101 5 Claims

Recovery of silver, polyester and amino acids from processed silver halide gelatin photographic film.

3,647,423

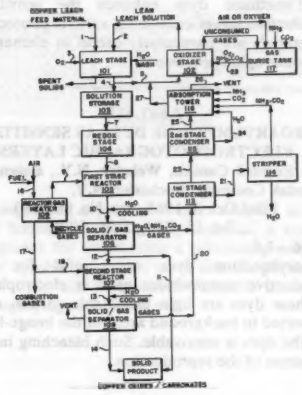
PRODUCTION OF COPPER, NICKEL OXIDE AND ZINC OXIDE

Floyd Acoveno, c/o Southern Lead Co., P. O. Box 6195, Dallas, Tex.

Filed Oct. 27, 1969, Ser. No. 869,782
Int. Cl. C22b *15/10, 19/24, 23/04*
U.S. Cl. 75—103 16 Claims

High-purity copper powder, nickel powder and zinc powder, high-purity oxides of these metals and high-purity

carbonates of these metals are recovered from copper-, nickel- or zinc-bearing materials by leaching the material with an aqueous ammonia-ammonium carbonate solution at an elevated temperature and under a partial pressure of oxygen. The copper-, nickel- or zinc-containing leach liquor is then separated from the insoluble residue and contacted with



hot gases to cause rapid decomposition of the corresponding metal ammonium carbonate solution into a gas/solids mixture. The resulting metal carbonate or metal oxide powder of high purity is then separated from the decomposition gas components and is recovered. These oxidic metal powders can be reduced with hydrogen to obtain high-purity metal powders.

3,647,424

MACHINABLE ALLOYS

George A. Majesko, Glen Ridge, N.J., assignor to Wilber B. Driver Company

Filed Nov. 3, 1969, Ser. No. 873,508
Int. Cl. C22c *39/10, 39/26, 39/54*
U.S. Cl. 75—123 AA 4 Claims

A freely machinable alloy comprising, as expressed in percent by weight:

Nickel	25%–32%;
Cobalt	6.5%–27%;
Selenium	0.1%–0.4%;
Manganese	0.5%–1.5%;
Iron	Balance

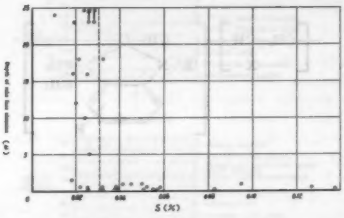
3,647,425

FREE CUTTING STEEL CONTAINING SMALL AMOUNTS OF ALUMINUM AND CALCIUM

Yoshio Miyashita, Kawasaki; Katuhiko Nishikawa, Yokohama, and Toshio Sata, Hoya, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 7, 1970, Ser. No. 26,341
Claims priority, application Japan, Apr. 7, 1969, 45/26129
Int. Cl. C22c *37/10, 39/02*
U.S. Cl. 75—124 1 Claim

A free cutting steel having excellent mechanical properties, e.g., impact value and good free cutting property and that abrasion amount of used tool is little, in comparison with common Ca free cutting steel, ordinary S free cutting steel



and the like which is obtained by adjusting coexisting manner of Ca, S, and Sol·Al in steel.

3,647,426

PROCESSES FOR THE PRODUCTION OF IRON-NICKEL ALLOYS HAVING A HIGH-NICKEL CONTENT

Xavier Wache, La Turlurette, Sauvigny-les-Bois, (Nievre), France

Continuation-in-part of application Ser. No. 652,484, July 11, 1967, now abandoned. This application Jan. 27, 1970, Ser. No. 6,140
Claims priority, application France, July 12, 1966, 69164
Int. Cl. C22c *39/40, 39/50, 39/54*
U.S. Cl. 75—129 1 Claim

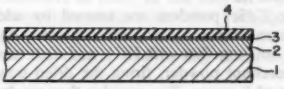
A process for improving the weldability of iron-nickel alloys with a nickel content higher than 30 percent in weight, which introduces into the alloy during its production an addition of at least one of the elements of the group vanadium, titanium, zirconium and niobium, said elements forming nitrides with the nitrogen present in the alloy.

3,647,427

GERMANIUM AND SILICON ADDITIVES TO DUAL-LAYER ELECTROPHOTOGRAPHIC PLATES

Hiroshi Hanada, Yokohama; Nobuo Kitajima, and Tatsuo Masaki, both of Tokyo, all of Japan, assignors to Cannon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 21, 1970, Ser. No. 65,955
Claims priority, application Japan, Aug. 27, 1969, 44/67165
Int. Cl. G03g *5/02*
U.S. Cl. 96—1.5 10 Claims



An electrophotographic photosensitive member comprises a layer containing selenium, tellurium and at least one of germanium and silicon as an additive and a layer containing selenium and at least one of germanium and silicon as an additive.

3,647,428

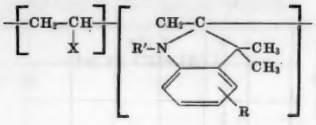
PHOTOCONDUCTIVE MATERIAL FOR ELECTROPHOTOGRAPHY

Hisatake Ono; Syu Watarai, and Harumi Katsuyama, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 27, 1970, Ser. No. 93,387
Claims priority, application Japan, Nov. 28, 1969, 44/95990
Int. Cl. G03g *5/06*
U.S. Cl. 96—1.5 3 Claims

A photoconductive material comprising an electroconductive support having coated thereon a layer containing a sen-

sitizer, a plasticizer and a high-molecular compound having the following repeating unit:



wherein X is CN or COOR′, R is hydrogen atom, halogen atom, OR′ or COOR′, and R′ is alkyl group having one to four carbon atoms.

3,647,429

PHOTOCONDUCTIVE COMPOSITIONS AND ELECTROPHOTOGRAPHIC ELEMENTS CONTAINING GROUP IVA OR GROUP VA ORGANOMETALLIC PHOTOCONDUCTORS

Martin Goldman, and Arthur L. Johnson, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed July 3, 1967, Ser. No. 650,664
Int. Cl. G03g *5/00, 7/00*
U.S. Cl. 96—1.5 **9 Claims**

Photoconductive compositions and electrophotographic elements containing as photoconductors organometallic compounds having at least one aminoaryl group attached to a Group IV*a* or Group V*a* metal atom through an aryl moiety.

3,647,430

METHOD OF THE PREPARATION OF CDS OR CDSE POWDER FOR ELECTROPHOTOGRAPHY AND METHOD OF MAKING AN ELECTROPHOTOGRAPHIC PHOTOSENSITIVE PLATE BY USING THE POWDER

Hiroshi Hanada, Yokohama-shi, and Nobuo Kitajima, Tokyo, both of Japan, assignors to Canon Camera Kabushiki Kaisha, Tokyo, Japan

Filed June 5, 1968, Ser. No. 734,637
Claims priority, application Japan, June 8, 1967, 42/36627
Int. Cl. G03g *5/00, 7/00*
U.S. Cl. 96—1.5 **4 Claims**

CdS or CdSe powders are treated by adding silver or copper as an activator, firing the mixture in the presence of $CdCl_2$ or ZnO together with HC1, and after washing and drying the resultant powder, firing the dried powder in an atmosphere of S vapor. The powder thus produced is mixing with a bonding resin to form a photosensitive layer and an electrophotographic photoconductive plate is made therefrom.

3,647,431

SUBSTITUTED BIS(P-DIAKYLAMINOPHENYL) METHANE PHOTOCONDUCTORS

Louis J. Rossi, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 1, 1969, Ser. No. 862,923
Int. Cl. G03g *5/06*
U.S. Cl. 96—1.5 **10 Claims**

Organic photoconductors for electrophotographic elements are described. These photoconductors are bis-(p-dialkylaminophenyl)methanes having a third substituent comprising an unsaturated group having two or four carbon atoms wherein an ω-carbon atom of the third substituent is fully substituted by aryl group(s), heterocyclic group(s) or combinations thereof.

3,647,432

CARBAZOLYLMETHANE DYE SALTS AS SENSITIZERS FOR PHOTOCONDUCTOR COMPOSITIONS

Colin Holstead, 37 Abbotts Road Abbotts Langley, Walford, England

Filed Oct. 22, 1969, Ser. No. 868,600
Int. Cl. G03g *5/06, 5/08*
U.S. Cl. 96—1.6 **15 Claims**

Tris(9-alkylcarbazol-3-yl)methane dyes and tris(9-arylcarbazol-3-yl)methane dyes enhance the sensitization of photoconductive layers containing various photoconductors. These materials are particularly useful in elements used in electrophotographic processes.

3,647,433

DINITROARYLMETHINE DYES AS SENSITIZERS IN ELECTROPHOTOGRAPHIC LAYERS

Lawrence Edward Contois, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 3, 1969, Ser. No. 863,691
Int. Cl. G03g *5/06, 5/08*
U.S. Cl. 96—1.6 **17 Claims**

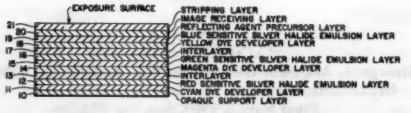
Dinitroarylmethine dyes are useful for sensitizing photoconductive compositions used in electrophotographic layers. These dyes are light bleachable so that undesirable color imparted to background areas of the image-bearing element by the dyes is removable. Such bleaching increases the visual contrast of the reproduction.

3,647,434

INTEGRAL NEGATIVE/POSITIVE COLOR DIFFUSION TRANSFER PROCESS FILM UNIT EMPLOYING IN SITU GENERATED VISIBLE LIGHT-REFLECTING AGENT

Edwin H. Land, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed June 5, 1970, Ser. No. 43,741
Int. Cl. G03c *7/00, 5/54, 1/84*
U.S. Cl. 96—3 **43 Claims**



This application is directed, in general, to an integral negative/positive color diffusion transfer process film unit which comprises a dimensionally stable common support carrying on one surface a dyeable polymeric layer, a photosensitive silver halide emulsion layer having associated dye transfer image-forming material and a layer comprising a light-reflecting agent precursor which comprises, upon contact with a processing composition, first ionic species adapted to interact with second ionic species to provide a substantially white, inorganic visible light-reflecting agent intermediate the dyeable polymeric layer and the photosensitive silver halide emulsion layer, and to specified diffusion transfer color processes employing such a film unit.

3,647,435

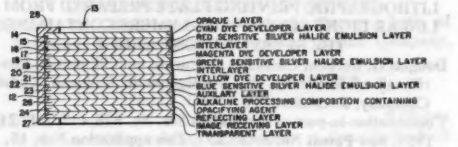
INTEGRAL NEGATIVE/POSITIVE COLOR DIFFUSION TRANSFER PROCESS FILM UNIT EMPLOYING IN-SITU GENERATED VISIBLE LIGHT-REFLECTING AGENT

Edwin H. Land, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed June 5, 1970, Ser. No. 43,742
Int. Cl. G03c *7/00, 5/54, 1/84*
U.S. Cl. 96—3 **42 Claims**

This application is directed, in general, to an integral negative/positive color diffusion transfer process film unit which

includes, in order, an opaque layer, a photosensitive silver halide layer having associated dye transfer image-forming material, a layer comprising a light-reflecting agent precursor which comprises, upon contact with a processing composition, first ionic species adapted to interact with second ionic species to provide a substantially white, inorganic visible



light-reflecting agent, a polymeric layer adapted to be dyed by the dye transfer image-forming material, a transparent layer, and means for distributing a processing composition between the dyeable polymeric layer and the photosensitive silver halide layer, and to specified diffusible transfer color processes employing such a film unit.

3,647,436

DEVELOPERS FOR DIFFUSION TRANSFER FILM UNITS

Walter M. Bush, Victor, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 31, 1970, Ser. No. 68,478
Int. Cl. G03c *7/00, 5/54, 1/48*
U.S. Cl. 96—3 **22 Claims**

The use of 4-amino-3-alkoxy-N-ethyl-N-β-hydroxyethylaniline developing agents in a diffusion transfer film unit employing at least one nondiffusible coupler capable of reacting with oxidized aromatic primary amino color developing agent to produce a diffusible dye is more effective than analogous paraphenylenediamine color developing agents.

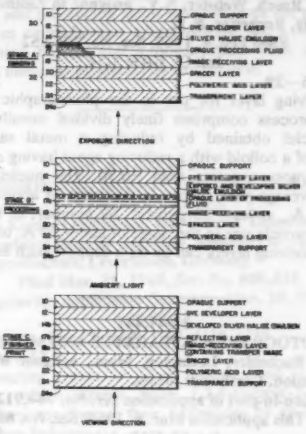
3,647,437

PHOTOGRAPHIC PRODUCTS, PROCESSES AND COMPOSITIONS

Edwin H. Land, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of application Ser. No. 786,352, Dec. 23, 1968, Continuation-in-part of application Ser. No. 43,782, June 5, 1970, abandoned. This application Dec. 18, 1970, Ser. No. 101,968
Int. Cl. G03c *5/54, 7/00, 1/84*
U.S. Cl. 96—3 **134 Claims**

Photographic films and particularly film units for performing diffusion transfer processes, are disclosed which may be processed outside of a camera. A light-absorbing reagent is employed to prevent postexposure fogging by actinic light passing through a transparent face of the film unit. After a suitable period, the light-absorbing reagent is rendered ineffective to prevent viewing an image through said transparent face. In a preferred embodiment, the image is viewed against a light-reflecting material such as a white pigment, said light-reflecting material and said light-absorbing material being employed in combination to provide desired protection against said postexposure fogging. Particularly useful light-absorbing materials are dyes which are light absorbing at a pH at which image formation is effected and nonlight-absorbing at a subsequently attained pH. Other light-absorbing reagents including dyes which are selectively mordanted to render them ineffective to prevent viewing transfer images visible against a light-reflecting material. The final image may



be dye or silver. Suitable image-forming reagents include dye developers, color couplers, coupling dyes, etc.

3,647,438

METHOD OF MAKING HIGH AREA DENSITY ARRAY PHOTOMASKS HAVING MATCHING REGISTRY

Frederic Paul Heiman, East Brunswick, N.J., assignor to RCA Corporation

Filed Dec. 29, 1969, Ser. No. 888,249
Int. Cl. G03c *5/04*
U.S. Cl. 96—27 **8 Claims**

The method comprises: printing a master photomask having an array of opaque elements on a photographic photosensitive layer with overexposure; developing the overexposed photosensitive layer to produce a submaster photomask, the submaster having an array of smaller, opaque elements and repeating the steps of printing by overexposing and developing a number of times, using the successive submasters in place of the master to produce a subsequent submaster photomask, the subsequent submaster having opaque elements substantially smaller than the elements of the master and having matching registry with the master.

3,647,439

PHOTOGRAPHIC ELEMENT, COMPOSITION AND PROCESS

Jon Dolf Bass, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 1, 1968, Ser. No. 764,330
Int. Cl. G03c *5/54, 5/24, 5/38*
U.S. Cl. 96—29 R **23 Claims**

Photographic elements, compositions and processes employing certain stable sources of metal for physical development, including certain metal-organic complexes, such as metal-thiazoline thione or metal-thiazolidine thione complexes or metal-alkyne complexes, provide good images. Silver-dye complexes are especially suitable as a photosensitive material for use with these metal-organic complexes, typically silver-organic complexes.

3,647,440

PHOTOGRAPHIC DIFFUSION TRANSFER PRODUCT AND PROCESS

Arthur A. Rasch, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 4, 1969, Ser. No. 796,552
Int. Cl. G03c 5/54
U.S. Cl. 96—29 19 Claims

A receiving layer for use in the photographic diffusion transfer process comprises finely divided nonsilver noble metal nuclei obtained by reducing a metal salt in the presence of a colloid with a reducing agent having a standard potential more negative than −0.30. The nuclei typically have an average particle size in the range of about 15 A. to about 65 A., at least 80 percent, by number, of the nuclei having a particle size in the range of about 20 A. to about 50 A. The receiving layers can be on a support such as paper or film base.

3,647,441

PHOTOGRAPHIC APPARATUS AND METHOD

Albert J. Bachelder, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of application Ser. No. 744,912, July 15, 1968. This application Mar. 6, 1969, Ser. No. 804,819
Int. Cl. G03c 5/54
U.S. Cl. 96—29 13 Claims

A self-developing camera for use with a photographic film unit including a photosensitive sheet and a second sheet secured in face-to-face relation by external binding strips secured to the lateral margins of the sheets and adapted to be processed to produce a visible image by a liquid processing agent distributed between the sheets in a uniform thin layer at least coextensive with the exposed area of the photosensitive sheet. The camera includes a pair of juxtaposed pressure-applying rolls for distributing the processing liquid between the sheets, and one of the rolls includes annular grooves near its ends for receiving lateral edge portions of the binding strips during movement of the film unit between the rolls to relieve the pressure on the edge portions of the binding strips while the medial sections of the rolls engage the sheets and are spaced apart by engagement of the end sections of the rolls with the binding strips at the lateral edges of the film unit.

3,647,442

LAMINATIONS

Robert L. Malster, Wellesley, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of application Ser. No. 451,705, Apr. 29, 1965, now abandoned. This application July 3, 1969, Ser. No. 843,907
Int. Cl. G03c 5/54
U.S. Cl. 96—29 11 Claims

A laminar structure comprising a diffusion transfer color photographic image on a stratum comprising a mixture of polyvinyl pyridine and polyvinyl alcohol, the surface of said stratum being bonded to the surface of a transparent layer or sheet material, and identification (ID) cards including the same.

3,647,443

LIGHT-SENSITIVE QUINONE DIAZIDE POLYMERS AND POLYMER COMPOSITIONS

Frederick J. Rauner; Joseph A. Arcesi, and John R. Guild, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 12, 1969, Ser. No. 857,587
Int. Cl. G03f 7/02; G03c 1/52; C07c 117/00
U.S. Cl. 96—33 23 Claims

Polyalkylene glycols end-capped with o-quinone diazide groups are a novel class of light-sensitive polymers which range from viscous liquid to waxy materials. The polymers can be used alone or in conjunction with other light-sensitive and nonlight-sensitive polymers to prepare light-sensitive coating compositions. Preparation of photoresists and printing plates using polymer compositions of this invention is described.

3,647,444

LITHOGRAPHIC PRINTING PLATE PREPARED FROM LINEAR LIGHT-SENSITIVE POLYMERS CONTAINING THE STYRYL KETONE GROUP

Douglas G. Borden; Cornelius C. Unruh, and Stewart H. Merrill, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of application Ser. No. 828,455, July 21, 1959, now Patent No. 3,453,237. This application Nov. 15, 1968, Ser. No. 776,263. The portion of the term of this patent subsequent to July 1, 1986, has been disclaimed.
Int. Cl. G03c 1/68; G03f 7/02
U.S. Cl. 96—33 18 Claims

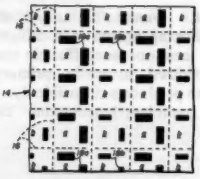
Photosensitive elements are described which are useful for preparing lithographic printing plates and which employ, as the light-sensitive component, polyesters, including polycarbonates, which contain the styryl ketone group as an integral part of the polymer backbone.

3,647,445

STEP AND REPEAT PHOTOMASK AND METHOD OF USING SAME

Carmen D. Burns, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 24, 1969, Ser. No. 869,218
Int. Cl. G03c 5/00
U.S. Cl. 96—35 8 Claims



A method is described for exposing a layer of photoresist so as to eliminate the defects which would otherwise be caused by a defective photomask. The method utilizes a unique mask in which the repetitive opaque patterns are identical except that the patterns in alternate rows are slightly larger than the patterns in the other alternate rows. The photomask is aligned with the photoresist in the usual manner and the photoresist exposed. Then the photomask is indexed one row and the photoresist again exposed so that all areas of the photoresist are double exposed through different portions of the photomask, yet the edges of the unexposed areas are defined by a single exposure corresponding in size to the patterns in the rows which have the larger opaque areas.

3,647,446

PROCESS FOR PREPARING HIGH-RELIEF PRINTING PLATES

Michael J. Alsup, Rochester, and Alfredo R. Guevara, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 5, 1970, Ser. No. 16,975
Int. Cl. G03c 1/68
U.S. Cl. 96—35.1 19 Claims

Polymeric relief images suitable for use in the production of stereotype printing plates are provided by imagewise ex-

posing to actinic radiation a relatively thick photosensitive layer comprising a light-sensitive polymer capable of being efficiently sensitized and a sensitizing agent to insolubilize in depth the exposed areas of the photosensitive layer, after which a relief image can be developed by removing the unexposed areas of the layer.

3,647,447

DYED PHOTORESIST COMPOSITIONS

Richard E. Gilson, and Frederick J. Rauner, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 3, 1969, Ser. No. 803,996
Int. Cl. G03c *5/100, 1/68*
U.S. Cl. 96—35.1 **9 Claims**

A photosensitive coating composition is described which comprises a photoinsolubilizable polymer, such as a cinnamic acid ester of a hydroxyl-containing polymer, and a dye which is insoluble in the developer solvent and which is essentially transparent to radiation of the wavelength to which the photoinsolubilizable polymer is sensitive. The photosensitive compositions are useful in preparing highly colored photoresists without a loss in photographic speed.

3,647,448

LIGHT SENSITIVE HALOCARBON AND PHENOL DERIVATIVE COMPOSITION

Dennis E. DeMeyer, Rochester, N.Y., and Frank D. Allen, deceased, late of Rochester, N.Y. (by Mona Armstrong Allen, executrix), assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 2, 1970, Ser. No. 15,890
Int. Cl. G03c *5/24, 1/72*
U.S. Cl. 96—48 **6 Claims**

Photographic elements having a support on which is coated a layer including a light-sensitive halocarbon and a phenol derivative like 1-naphthol, pyrocatechol or 1-methoxy-2-naphthol, yield printout images on exposure to actinic rays. The printout image can be intensified by heating.

3,647,449

NEUTRALIZING BATH FOR USE IN PHOTOGRAPHIC PROCESSING

Richard J. Malloy, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed June 8, 1970, Ser. No. 44,576
Int. Cl. G03c *5/26*
U.S. Cl. 96—50 **3 Claims**

A neutralizing bath, employed in processing photographic elements to neutralize residual aldehyde resulting from prior treatment in an aldehydic prehardening bath and thereby to avoid the deleterious effects of carry through of the aldehyde into subsequent processing baths, is comprised of hydroxylamine or a water-soluble acid addition salt thereof and an hydroxyalkylidene diphosphonic acid or water-soluble salt thereof. The hydroxylamine serves to neutralize the aldehyde by reacting therewith, while the hydroxyalkylidene diphosphonic acid serves to stabilize the bath and facilitate its long term storage by inhibiting decomposition of the hydroxylamine.

3,647,450

ELECTROLESS DEPOSITION OF NI OR CO LIGHT-GENERATED AG NUCLEI

Ennio Calligaris, and Mario Rossello, both of Savona, Italy, assignors to Societa per Azioni Ferrania, Milan, Italy

Filed Sept. 9, 1968, Ser. No. 758,608
Claims priority, application Italy, Sept. 14, 1967, 39409 A/67
Int. Cl. G03c *5/24*
U.S. Cl. 96—48 **7 Claims**

An imaging process is shown wherein a recording element having a photosensitive layer comprising a composition which, upon light exposure, is capable of producing silver nuclei is exposed to a light image to cause formation of said nuclei. Upon said nuclei is then deposited a nonnoble metal by electroless deposition from a solution comprising a nonnoble metal and a reducing agent selected from the group consisting of an amine borane, a borohydride, and a combination of an amine borane and a borohydride. Also shown are recording elements produced by this method.

3,647,451

ANTIBRONZING AGENTS FOR PHOTOGRAPHIC SILVER IMAGES

Anita von Konig, Leverkusen, and Helmut Timmler, Wuppertal-Vohwinkel, both of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 21, 1969, Ser. No. 809,415
Claims priority, application Germany, Mar. 28, 1968, P 17 70 074.2
Int. Cl. G03c *7/00, 5/38, 1/76*
U.S. Cl. 96—52 **8 Claims**

Antibronzing agents for silver images dried at high temperatures, which agents have 1,3,4-triazole-3-mercaptan rings bridged together at their 5-positions by an interrupted hydrocarbon linkage.

3,647,452

DIRECT REVERSAL PHOTOGRAPHIC ELEMENT AND PROCESS

Raymond W. Hendess, Webster, and Hugh S. A. Gilmour, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed July 6, 1970, Ser. No. 52,721
Int. Cl. G03c *7/00, 5/52, 1/40*
U.S. Cl. 96—55 **34 Claims**

A light-sensitive color photographic element containing nondiffusible dye-forming couplers that react with oxidized aromatic primary amine color developing agents to form nondiffusible dye images and a sufficient amount of a competing coupler to react with substantially all of the color-developing agent oxidized during negative silver development, but not enough to interfere with positive dye image formation during subsequent fogging development, is used for direct reversal image reproduction. A coupler-incorporated photographic element that produces nondiffusible dye images during color development is direct reversal color processed by (1) contacting the element with a color developer solution in the presence of sufficient competing coupler to react with substantially all of the color-developing agent oxidized during negative silver development, but not enough to interfere with subsequent positive dye image formation and (2) contacting the element with bleach, then fix or bleach-fix to remove silver and silver halide.

3,647,453

STABILIZATION OF SILVER HALIDE EMULSIONS WITH 1,1 BIS-SULFONYL ALKANES

Grant M. Haist, Rochester; James R. King, Webster, and David A. Pupo, Churchville, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed June 1, 1970, Ser. No. 42,580
Int. Cl. G03c *5/38, 1/34*
U.S. Cl. 96—61 **20 Claims**

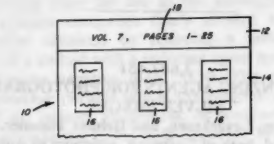
Silver halide emulsions and photographic elements containing a 1,1 bis-sulfonyl alkane stabilizing agent are stabilized after exposure by an alkaline activation treatment.

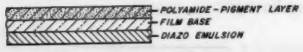
3,647,454

TITLE-BACKED PHOTOSENSITIVE MICROFICHE

Clarence S. Hunter, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 9, 1970, Ser. No. 9,586
Int. Cl. G03c 1/52, 1/00, 1/78
U.S. Cl. 96—67 6 Claims





A thin layer containing a suitable pigment in a polymeric binder is striped on a film base to provide, in the header region of a microfiche a surface that is receptive of titles (e.g., written, printed or typed images), makes photographically recorded images eyeball readable, is translucent to visible light, yet transparent to photographically active radiation (i.e., radiation capable of being detected after processing using conventional photosensitive materials and processes) thereby permitting conventional reproduction of the entire microfiche including the header region.

3,647,455

DIRECT POSITIVE EMULSIONS CONTAINING IODIDE IONS AND A SENSITIZING DYE

Cortland Russell Burt, and Peter Anthony Ciavarri, both of Rochester, N.Y., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 13, 1969, Ser. No. 865,976
Int. Cl. G03c 1/36
U.S. Cl. 96—64 7 Claims

Preparation of silver halide emulsions by (a) adding 5–15 mg. per mole of silver halide of a water-soluble inorganic iodide to an aqueous redispersion of a precipitated, ripened and washed, water-permeable colloid silver chlorobromide or bromide emulsion, and (b) adjusting the pH to 5–9 and digesting the emulsion at 110° to 150° F. for about 15–60 minutes, there being added per mole of silver halide 0.00033 to 12.0 g. of an amine borane as a fogging agent; characterized in that after the digesting step, there is added per mole of silver halide approximately 10–100 mg. of an optical sensitizing dye.

3,647,456

METHOD OF MAKING CONDUCTIVE SILVER IMAGES AND EMULSION THEREFOR

Harold H. Lerd, Ossining, and Theresa I. Sun, Peekskill, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1968, Ser. No. 786,366
Int. Cl. G03c 5/26
U.S. Cl. 96—38.4 1 Claim

A silver bromide emulsion containing cadmium iodide and coated on a substrate is employed to produce a latent silver image thereon. This latent image is developed in a high-resolution pattern developer to produce a silver image which when heated to a temperature of 200° to 450° C. produces an image having an electrical conductivity closely approaching that of bulk silver. The high-resolution pattern developer results in a feltlike structure of silver wires which when heated at higher temperatures decreases in reflectivity.

3,647,457

TECHNIQUE FOR RECORDING AND TESTING THE REGISTRATION OF SEQUENTIAL MASK SETS

Robert E. Kerwin, Westfield, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 13, 1969, Ser. No. 865,971
Int. Cl. G03c 5/04, 7/26
U.S. Cl. 96—41 7 Claims

A technique for recording the registration of a sequence of photomasks involves coating a reflective substrate with a photosensitive film and exposing the substrate to light through the first of the sequence of masks until a visible image is obtained. The next mask in the set is then aligned and the procedure repeated.

3,647,458

SOLARIZATION OF SILVER HALIDE PHOTOGRAPHIC EMULSIONS

Giovan Battista Tagliafico, Albisola Mare, and Ferdinando Grazzino, Veneto, both of Italy, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 26, 1970, Ser. No. 14,454
Claims priority, application Italy, Mar. 11, 1969, 35625
Int. Cl. G03c 5/32
U.S. Cl. 96—45.2 9 Claims

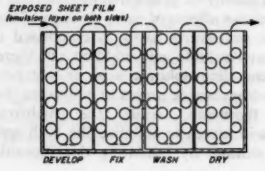
Silver halide is solarized by treatment with an aldehyde having more than one carbon atom or a ketone to provide direct positive photographic emulsions.

3,647,459

NOVEL PHOTOGRAPHIC ELEMENTS AND MEANS FOR RAPID PROCESSING OF PHOTOGRAPHIC ELEMENTS

Robert C. Taber, and William H. Russell, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of application Ser. No. 649,697, June 28, 1967, now abandoned. This application Feb. 1, 1968, Ser. No. 702,381
Int. Cl. G03c 1/08, 5/30
U.S. Cl. 96—66.5 25 Claims



A photographic element comprising an acrylic interpolymer can be rapidly processed at high temperatures to provide an image record exhibiting reduced haze and improved photographic properties. The acrylic interpolymer contained in the photographic element is compatible with gelatin and has a Tg of less than 20° C. In another aspect of this invention, a photographic element comprising an acrylic interpolymer and a development modifier exhibit improved photographic properties.

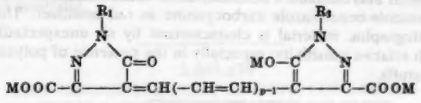
3,647,460

METHOD OF PRODUCING PHOTOGRAPHIC IMAGES BY RAPID PROCESSING

Emiel Alexander Hofman, Mortsel; Theofiel Hubert Ghys, Kontich, and Henri Depoorter, Mortsel, all of Belgium, assignors to Gevaert-Agfa N.V., Mortsel, Belgium

Filed May 18, 1970, Ser. No. 38,483
Claims priority, application Great Britain, May 30, 1969, 27,576/69
Int. Cl. G03c 5/30, 1/84, 1/06
U.S. Cl. 96—66 17 Claims

A rapid process for producing a photographic image is disclosed wherein the photographic silver halide element comprises as light absorbing antihalation or filter dye, a dye of the formula:



wherein: p stands for 1, 2 or 3, each of R_1 and R_2 is an aryl group, and M is a cation.

The dye is very rapidly discharged upon processing of the exposed element and leaves no stains in the processed element. The dye is, therefore, particularly suitable for use in a photographic silver halide film element in which upon exposure a stable silver image is formed in the least possible time by "stabilization processing" which comprises developing the exposed element and treating the developed element with a stabilizing solution.

3,647,461

METHODS AND MATERIALS FOR REPLENISHMENT OF DEVELOPERS FOR COLOR PHOTOGRAPHIC FILMS

John J. Surash; Edward J. Giorgianni, and Lynn R. Hotter, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 19, 1969, Ser. No. 800,708
Int. Cl. G03c 5/30
U.S. Cl. 96—66 17 Claims

Developer replenishers having buffer controlled high pH and high potassium/sodium weight ratio are effective at low replenishment rates; for example, developer replenishers having a pH of 10.5 to 11 containing a potassium/sodium weight ratio of at least 5.4/1,p-phenylenediamine developing agent and benzyl alcohol in weight ratio of between about 1/1.5 and 1/2 and sulfite are especially effective. Such replenishers are advantageously prepared from kits comprising at least two solutions, one a buffered aqueous alkaline solution containing alkali metal ions in a high potassium/sodium weight ratio and another an aqueous solution having low pH and containing p-phenylenediamine developing agent in high concentration. The replenishers are utilized in conjunction with the processing of imagewise exposed, multilayer, incorporated coupler, silver halide sensitized, color photographic film materials.

3,647,462

METHODS AND MATERIALS FOR REPLENISHMENT OF DEVELOPERS FOR COLOR PHOTOGRAPHIC FILMS (B)

John J. Surash; Edward J. Giorgianni, and Lynn R. Hotter, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 19, 1969, Ser. No. 800,728
Int. Cl. G03c 5/30
U.S. Cl. 96—66 18 Claims

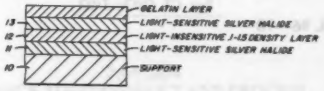
Developer replenishers having buffer controlled high pH and high potassium/sodium weight ratio are effective at low-replenishment rates; for example, developer replenishers having a pH of 10.5 to 11 containing a potassium/sodium weight ratio of at least 5.4/1,p-phenylenediamine developing agent and benzyl alcohol in weight ratio of between about 1/1.5 and 1/2 and sulfite are especially effective. Such replenishers are advantageously prepared from kits comprising at least two solutions, one a buffered aqueous alkaline solution containing alkali metal ions in a high potassium/sodium weight ratio and another an aqueous solution having low pH and containing p-phenylenediamine developing agent in high concentration. The replenishers are utilized in conjunction with the processing of imagewise exposed, multilayer, incorporated coupler, silver halide sensitized, color photographic film materials.

3,647,463

DIRECT-POSITIVE PHOTOGRAPHIC ELEMENTS CONTAINING MULTIPLE LAYERS

Robert C. Taber, and James E. Koller, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 14, 1969, Ser. No. 850,197
Int. Cl. G03c 1/76
U.S. Cl. 96—68 16 Claims



This invention relates to direct-positive silver halide elements comprising (1) duplicate layers containing silver halide emulsions having substantially the same light-response characteristics and (2) means for providing a sensitivity difference between said duplicate layers of at least 0.5 log exposure. In certain preferred embodiments, relatively light-insensitive absorbing silver halide emulsions and/or light-absorbing dyes are used in an interlayer to provide an effective density of 0.1 to 1.5.

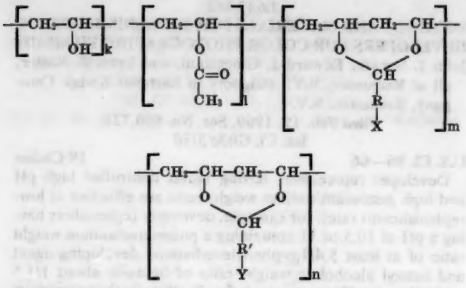
3,647,464

SULFONATED POLY(VINYL ALCOHOL) DERIVATIVES AS ABSORBENT LAYERS IN PHOTOGRAPHIC PROCESSING WEBS

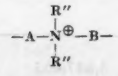
Donald A. Smith, Rochester, and Joseph A. Verdone, Greece, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 22, 1970, Ser. No. 30,968
Int. Cl. G03c 1/48
U.S. Cl. 96—76 23 Claims

A photographic processing web comprising a support having an absorbent layer for alkaline photographic processing solutions, said layer comprising a cross-linked polymer product of a polymer composed of recurring segments having the structure:



wherein *k* indicates about 64 to 95 mole percent, *l* indicates about 0 to 15 mole percent, *m* indicates about 5 to 20 mole percent, *n* indicates about 0 to 10 mole percent; X is SO_3 or $-SO_3Z$ wherein Z is an alkali metal or hydrogen; R′ is an alkylamino group; Y is a radical containing an active methylene group and R is a phenylene group or the positively charged portion of an inner salt having the structure:



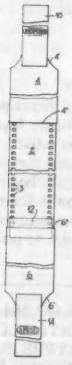
wherein A and B are alkylene groups and R″ is hydrogen or an alkyl group, with the proviso that when R is the positively charged portion of an inner salt, X is SO_3 , said layer having incorporated therein a silver precipitating agent.

3,647,465

PHOTOGRAPHIC FILM ROLL

Menashe Shamay, 130 Hanassi Ave., Haifa, Israel

Filed Aug. 22, 1969, Ser. No. 852,218
Int. Cl. G03c *3/02*
U.S. Cl. 96—78 **8 Claims**



A photographic film roll including a filmstrip wound on a film spool comprises two masking strips of an opaque plastic material one covering the beginning end of the filmstrip and the other covering the completed end. The outer end of the one masking strip and the inner end of the other masking strip are each attached to the nonemulsion side of the filmstrip. Each masking strip is wound with, and overlies the nonemulsion side of, its respective end of the filmstrip for at least several windings of the filmstrip when wound on the spool. The masking strips are slightly wider than the filmstrip so as to project slightly beyond its edges while covering the sprocket holes, and are made of thin, flexible plastic material such that the camera feeding sprockets passing through the sprocket holes of the filmstrip will emboss the masking strips but will not puncture them.

3,647,466

PHOTOGRAPHIC MATERIAL FOR THE SILVER DYESTUFF BLEACHING PROCESS

Heinrich Bruengger, Basel, and Carlo Boragine, Fribourg, both of Switzerland, assignors to Ciba Limited, Basel, Switzerland

Filed Aug. 21, 1969, Ser. No. 852,083
Claims priority, application Switzerland, May 26, 1968, 12772/68
Int. Cl. G03c *1/10*
U.S. Cl. 96—99 **11 Claims**

Photographic material for the silver dyestuff bleaching process is provided wherein at least one silver halide emulsion layer, containing a bleachable azo dyestuff as the image dyestuff also contains a benzselenazole-benzelenazole or benselenazole-benzthiazole carbocyanine as red-sensitizer. This photographic material is characterized by an unexpectedly high relative sensitivity, especially in the presence of polyazo dyestuffs.

3,647,467

HEXAARYLBIIMIDAZOLE-HETEROCYCLIC COMPOUND COMPOSITIONS

Eugene L. Grubb, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed May 22, 1969, Ser. No. 827,072
Int. Cl. G03c *1/72*, *1/68*
U.S. Cl. 96—90 **35 Claims**

Photoactivatable compositions comprising a hexaarylbiimidazole and a heterocyclic compound of the formula Ar^1—G—Ar^2 where Ar^1 is aryl of six to 12 nuclear carbons, Ar^2 is Ar^1 or arylene—G—Ar^1 and G is a divalent furan, oxazole or oxadiazole ring, and optionally, a leuco dye and/or a polymerizable monomer or inert components such as binders, solvents, and the like. The compositions are photoactivated in the near ultraviolet or visible light wavelengths.

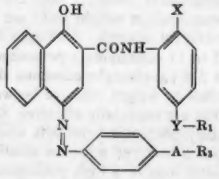
3,647,468

PHOTOGRAPHIC SILVER HALIDE ELEMENTS HAVING MAGENTA-COLORED COUPLER DYES

Alberto Guzzi; Remo Magagnoli, both of Ferrania, and Lorenzo Vittore, Pietra Ligure, all of Italy, assignors to Societa per Azioni Ferrania, Milan, Italy

Filed May 14, 1968, Ser. No. 728,887
Claims priority, application Italy, May 15, 1967, 800,361
Int. Cl. G03c *1/40*
U.S. Cl. 96—100 **12 Claims**

Photographic elements are shown which contain coupler dyes of the general formula:



wherein X is an alkyl group or a halogen group, Y is a —C-O— divalent radical or an $-SO_2-$ divalent radical, R_1 is an alkyl group having one to 18 carbon atoms, A is an $-NR_2SO$

$_2$—divalent radical in which R_2 is an alkyl group having one to 18 carbon atoms, and R_3 is an aryl group.

3,647,469
BISAMINOALKYL DISULFIDES AS SENSITIZERS AND STABILIZERS FOR SILVER HALIDE EMULSIONS
Harald Huckstadt, Cologne; Wilhelm Saleck, Schildgen-Bergisch Gladbach; August Randolph, and Franz Moll, both of Leverkusen, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany
Filed Dec. 19, 1969, Ser. No. 886,747
Claims priority, application Germany, Dec. 23, 1968, P 18 16 571.4
Int. Cl. G03c *1/28, 1/34*
U.S. Cl. 96—107 3 Claims

The present invention relates to a process for increasing the sensitivity of photographic silver halide emulsions together with reduced fogging by the addition of bis-aminoalkyl disulfides.

3,647,470
PHOTOSENSITIVE COMPOSITIONS CONTAINING FURYLACRYLYL-CONTAINING POLYMER
Minoru Tsuda, Kanagawa-ken, Japan, assignor to Agency of Industrial Science and Technology, Tokyo, Japan
Continuation-in-part of application Ser. No. 554,341, June, 1966, now abandoned. This application Oct. 21, 1969, Ser. No. 868,201
Claims priority, application Japan, June 9, 1965, 40/33784
Int. Cl. G03c *1/68*
U.S. Cl. 96—115 6 Claims

The present invention provides photosensitive compositions of high sensitivity comprising a photosensitive furylacrylyl-containing polymer having a polymerization degree of 500 or more wherein the furylacrylyl group is the photosensitive component of said polymer and wherein said furylacrylyl-containing polymer has been produced by the aqueous alkaline process. The photosensitive compositions are preferably mixtures of a photosensitive polymer and a sensitizer and/or other polymers.

3,647,471
PHOTOGRAPHIC REPRODUCTION OF HALFTONE SCREENS
Edward R. Thompson, North Hollywood, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.
Filed Nov. 19, 1969, Ser. No. 878,087
Int. Cl. G03f *5/00*
U.S. Cl. 96—116 2 Claims

The method of making, and article of manufacture therefor, of a photographic master wherein an unexposed sheet of orthochromatic film is secured to a rotatable drum, moving the drum longitudinally during rotation, and permitting a narrow light source to be exposed to the film resulting in a sheet of film having a series of extremely close parallel lines, and developing the film. The method of making, and article of manufacture therefor, of a halftone screen wherein an unexposed sheet of orthochromatic film is placed adjacent a photographic master, exposing the master onto the film, removing and replacing the master so that the lines of the master are at 90° to the first position, exposing again the film, and developing the film. The method of making and article of manufacture therefor of a halftone screen wherein an unexposed sheet of orthochromatic plate is placed adjacent a photographic master, exposing the master onto the plate, developing the plate, repeating the procedure to a second plate, placing the two exposed plates adjacent with the lines at 90°.

3,647,472
BEVERAGE MIX
Steven R. Speech, St. Paul; Joseph W. Opie, Minneapolis, and John A. Bridge, Eden Prairie, all of Minn., assignors to General Mills, Inc.
Continuation-in-part of application Ser. No. 732,026, May 27, 1968, now abandoned. This application May 8, 1970, Ser. No. 35,908
Int. Cl. C12f *1/00*; C12g *3/04*
U.S. Cl. 99—34 9 Claims

A nonalcoholic cocktail mix containing ingredients in such proportions that the mix can be stored under subfreezing conditions, in a frozen slush form. A chilled beverage, such as a cocktail, is prepared by combining and stirring a packet containing a predetermined amount of the frozen slush with a prescribed amount of at least one other ingredient, such as an alcoholic distillate.

3,647,473
MALTING GRAIN
Keith Christopher Stowell, Newark, and Peter Michael Howlett, Newark-on-Trent, both of England, assignors to A.B.M. (Malting) Limited, Newark-on-Trent, England
Filed July 15, 1968, Ser. No. 745,038
Claims priority, application Great Britain, July 21, 1967, 33,680/67
Int. Cl. C12c *1/00*
U.S. Cl. 99—52 20 Claims

A process and apparatus for dehusking cereal grain by a dry mechanical method at a temperature not above about 105° F., and wherein the moisture content of the grain is above about 8 percent by weight in order to damage the grain so that substantial rootlet growth is prevented without substantially damaging the aleurone layer. The dehusked grain is subsequently malted and there are advantages compared with conventional malting of husked grain.

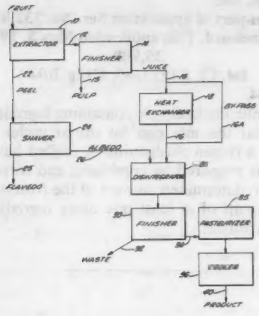
3,647,474
SNACK FOOD PRODUCT AND PROCESS
Charles Dame, Jr., Wheaton, Ill.; William S. Stinson, Jr., New City, N.Y., and Anthony C. Capossela, North Tarrytown, N.Y., assignors to General Foods Corporation, White Plains, N.Y.
Filed Oct. 30, 1969, Ser. No. 872,758
Int. Cl. A23l *1/10*
U.S. Cl. 99—83 9 Claims

A snack food product comprises popped popcorn in a dough matrix containing tapioca flour, corn flour and potato starch and is deep fat fried. The snack food product contains sucrose and an alkali metal bicarbonate which serve to improve the stability of the deep fat fried snack food product as well as to enhance the flavor thereof. The process for preparing the snack food is also described.

3,647,475
CLOUD FORTIFIED CITRUS FRUIT JUICES
Peter L. Douglas, Glendora, Calif., assignor to Brown International Corporation, Whittier, Calif.
Continuation of application Ser. No. 496,970, Oct. 18, 1965, now abandoned. This application Aug. 6, 1969, Ser. No. 850,326
Int. Cl. A23l *1/02*
U.S. Cl. 99—105 13 Claims

A cloud fortified citrus fruit juice product is prepared by incorporating into an extracted citrus fruit juice a quantity of

finely divided albedo, or inner white layer of the rind or peel



of the citrus fruit, from which the outer flavedo layer containing the oil has been removed.

3,647,476

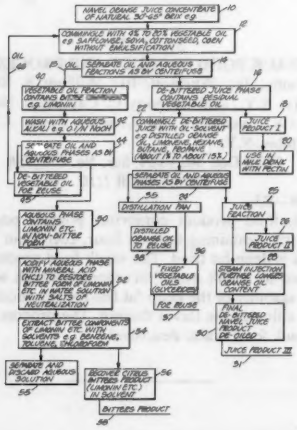
LIMONIN FREE NAVAL ORANGE JUICE AND DRINK OF MILK EMBODYING SUCH ORANGE JUICE

Horton E. Swisher, Upland, Calif., assignor to Sunkist Growers, Inc., Los Angeles, Calif.

Filed Nov. 24, 1969, Ser. No. 879,432

Int. Cl. A23l *1/02*

U.S. Cl. 99—105 **14 Claims**


NAVEL ORANGE JUICE CONCENTRATE OF NATURAL 30°-65° DEVI e.g.
COMMINGLE WITH 3% TO 70% VEGETABLE OIL e.g. SAFFLOWER, SOYA, COTTONSEED, CORN WITHOUT EMULSIFICATION
SEPARATE OIL AND AQUEOUS FRACTIONS AS BY CENTRIFUGE
OIL
VEGETABLE OIL FRACTION CONTAINS LIMONIN, BITTER CONSTITUENTS e.g. LIMONIN
DE-BITTERED JUICE PHASE CONTAINS RESIDUAL VEGETABLE OIL
WASH WITH AQUEOUS ALKALI e.g. Ca(OH)2 SOLN
COMMINGLE DE-BITTERED JUICE WITH OIL SOLVENT e.g. DISTILLED ORANGE OIL, LIMONENE, HEXANE, BUTANE, METHANOL, ABOUT 1% TO ABOUT 15%
JUICE PRODUCT I
USE IN MILK DRINK WITH PECTIN
SEPARATE OIL AND AQUEOUS PHASES AS BY CENTRIFUGE
DE-BITTERED VEGETABLE OIL FOR REUSE
MEMBERS OF AND AQUEOUS PHASES AS BY CENTRIFUGE
DISTILLATION PAN
JUICE FRACTION
AQUEOUS PHASE CONTAINS LIMONIN, ETC., IN NON-BITTER FORM
DISTILLED ORANGE OIL TO REUSE
JUICE PRODUCT II
ACIDIFY AQUEOUS PHASE WITH MINERAL ACID (HCl) TO RESTORE BITTER FORM OF LIMONIN, ETC. IN WATER SOLUTION WITH SALTS OF NEUTRALIZATION
FIXED VEGETABLE OILS, OLEORESINS
STEAM DISTILLATION FURTHER LOWERS ORANGE OIL CONTENT
OIL FOR REUSE
FINAL DE-BITTERED NAVEL JUICE PRODUCT, DE-OILED
EXTRACT BITTER COMPONENTS OF LIMONIN, ETC. WITH SOLVENTS e.g. BENZENE, TOLUENE, CHLOROFORM
JUICE PRODUCT III
SEPARATE AND RECOVER AQUEOUS SOLUTION
RECOVER SOLID BITTERS PRODUCT (LIMONIN ETC.) AS SOLIDS
BITTERS PRODUCT

This invention involves debittered navel orange juice and a method of debittering such juice, as well as a juice and cow's milk drink in which such debittered juice is employed, a preferably high-ester level pectin being employed in the drink to avoid large curd formation from the milk by the acid of the juice. Recovery of the bitter principle extracted from the juice is also an element.

3,647,477

SURFACTANT COMPOSITION FOR FROZEN CONFECTIONS

James W. Du Ross, Claymont, and Gabriel P. Lensack, Wilmington, both of Del., assignors to Atlas Chemical Industries, Inc., Wilmington, Del.

Continuation-in-part of application Ser. No. 807,988, Mar. 17, 1969, now abandoned. This application Feb. 10, 1970, Ser. No. 10,267

Int. Cl. A23g *5/00*

U.S. Cl. 99—136 **12 Claims**

Ethylene oxide adducts of partial esters of sorbitan and mixed saturated and unsaturated long chain fatty acid and of mixed partial esters of sorbitan and saturated long chain fatty acid and of sorbitan and unsaturated long chain fatty acid are provided as surfactant materials useful, for example, in the preparation of frozen confections.

3,647,478

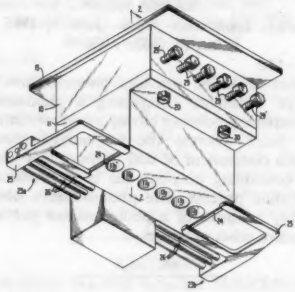
METHOD FOR EXTRUSION OF ICE CREAM

Ronald E. Minor, and Sidney B. McMillion, both of Richmond, Va., assignors to Eskimo Pie Corporation, Richmond, Va.

Original application Nov. 13, 1968, Ser. No. 775,340, now Patent No. 3,572,259. Divided and this application June 16, 1970, Ser. No. 57,844

Int. Cl. A21d *8/00*; A23p *1/00*

U.S. Cl. 99—137 **4 Claims**



Method for manufacturing in quantity, pellets of ice cream and other frozen dessert confections of uniform size by continuously extruding lengths of the dessert in the form of a congealable mass from a plurality of orifices in a single extruder head and periodically severing the extruded lengths to form the individual pellets, each orifice being provided with means for adjusting the rate of flow of the congealable mass from the orifice.

3,647,479

METHOD OF FLAVORING FOOD BY ADDITION OF BENZOXEPIN-3-ONES AND BENZODIOXEPIN-3-ONES

John J. Beereboom, Old Lyme; Donald P. Cameron, and Charles R. Stephens, both of New London, all of Conn., assignors to Pfizer Inc., New York, N.Y.

Original application Aug. 15, 1966, Ser. No. 572,206. Divided and this application Oct. 28, 1969, Ser. No. 2,058

Int. Cl. A23l *1/22*

U.S. Cl. 99—140 R **4 Claims**

Benzoxepin-3-ones and Benzodioxepin-3-ones, prepared by a novel synthesis, are useful as flavor and odorant agents for foods and perfumes respectively to impart a watermelon-like taste and odor.

3,647,480

PROCESS FOR PREPARING CONDIMENT-CONTAINING FATTY PARTICULATES

Robert E. Cermak, Chicago, Ill., assignor to SCM Corporation, Cleveland, Ohio

Filed Feb. 6, 1969, Ser. No. 797,236
Int. Cl. A23l 1/26
U.S. Cl. 99—140 R 7 Claims

An improvement in a process for preparing a condiment-containing fatty particulate comprises contacting condiment in a zone with preformed fatty matrix particles. The temperature during the contacting operation is sufficiently low and the contact is conducted for a time sufficient for making discrete composite particles of the matrix particles and the condiment without substantial uncontrolled agglomeration of either the matrix or resulting composite particles. The exterior of the fatty matrix particle during the contacting operation, usually a physically blending, advantageously is softened or slightly plasticized. The fatty matrix particle can act to substantially enrobe or to sorb the condiment. The resulting discrete particles can be substantially simultaneously formed or post-formed into agglomerates of predetermined size or size range by uniting a plurality of the discrete composite particles. Both the discrete composite particles and their agglomerates are useful in the production of foodstuffs such as cakes, doughnuts, rolls, bread, coffee cake, frosting mixes, whipped toppings, and the like.

3,647,481

METHOD OF MAKING ALIPHATIC DI- AND TRISULFIDE FLAVORING MATERIALS

Michael H. Brodnitz, Matawan, and John V. Pascale, Old Bridge, both of N.J., assignors to International Flavors & Fragrances, Inc., New York, N.Y.

Filed June 13, 1969, Ser. No. 833,158
Int. Cl. A23l 1/26
U.S. Cl. 99—140 R 10 Claims

Processes for the production of alliaceous flavoring compositions comprising reacting specified mixtures of Bunte salts (S-alkyl and/or S-alkylene thiosulfates) wherein the alkyl and alkylene groups contain up to three carbon atoms, with an alkali metal sulfide at temperatures of 0° to 100° C. to obtain a mixture of dialkyl, dialkylene, or alkyl alkylene di- and trisulfides having an alliaceous flavor impression.

3,647,482

REDUCTION AND MODIFICATION OF THE UNPLEASANT AFTERTASTE OF SACCHARIN

Mao Hsun Yueh, Minneapolis, Minn., assignor to General Mills, Inc.

Continuation-in-part of application Ser. No. 539,669, Apr. 4, 1966, now abandoned. This application Mar. 4, 1970, Ser. No. 16,602
Int. Cl. A23l 1/26
U.S. Cl. 99—141 A 4 Claims

The unpleasant aftertaste of saccharin-containing compositions is reduced by incorporating with the saccharin a flavor modifier selected from the group consisting of ribonucleosides, ribonucleotides and their deoxy analogs. The saccharin and flavor modifier mixture is heat-treated such as by boiling the mixture in water.

3,647,483

CYCLAMATE-FREE CALORIE-FREE SWEETENER

Marvin E. Eisenstadt, Belle Harbor, N.Y., assignor to Cumberland Packing Corporation, Brooklyn, N.Y.

Continuation-in-part of application Ser. No. 869,383, Oct. 24, 1969, now abandoned. This application Mar. 30, 1970, Ser. No. 23,987
Int. Cl. A23l 1/26
U.S. Cl. 99—141 A 4 Claims

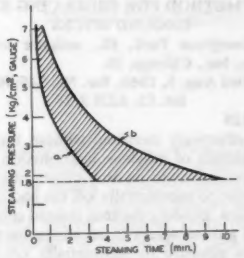
This invention relates to noncaloric saccharine artificial sweetening compositions, and more particularly to sweetening compositions which are free of cyclamate, contain only saccharine as the artificial sweetener, but which contain additives which do not add calories but nevertheless eliminate the undesired bitter aftertaste of the saccharine. The additives which are used according to this invention, and which must be used in combination because the only sweetening agent is saccharine, are glucono delta lactone, sodium gluconate and/or potassium gluconate and cream of tartar powder (potassium bitartrate).

3,647,484

METHOD OF PREPARING SOY

Tamotsu Yokotsuka, Higashikatsushika-gun; Tatsuo Aonuma, Kashiwa-shi; Koya Mogi; Danji Fukushima; Atsushi Yasuda; Hiroharu Watanabe; Naoshi Tsukada, and Akira Arai, all of Noda-shi, Japan, assignors to Kikkoman Shoyu Co., Ltd., Noda-shi, Japan

Filed Feb. 27, 1969, Ser. No. 802,969
Int. Cl. A23l 1/20, 1/22
U.S. Cl. 99—145 5 Claims



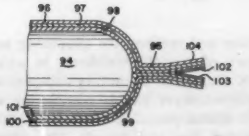
A method of preparing soy which is featured in that soybeans obtained by steaming soybeans of a moisture content of 30–70 percent by weight with saturated steam of a gauge pressure not less than 1.8 kg./cm.² for a short period of time not exceeding 10 minutes, followed by rapid cooling to a temperature not exceeding 100° C. are used as the starting material for the preparation of soy. And the method can provide a soy of superior flavor and of high quality wherein the possibility of the formation of clouds and precipitates when diluted and heated in its use does not occur, and can be carried out industrially advantageously with improved yield and good reproducibility.

3,647,485

PACKAGE AND METHOD OF MAKING SAME

Oscar E. Seiferth; Robert L. Goller; Paul E. Grindrod, all of Madison, and Harry L. Radloff, Sun Prairie, all of Wis., assignors to Oscar Mayer & Co., Inc., Chicago, Ill.

Filed Aug. 21, 1968, Ser. No. 754,361
Int. Cl. B65b 25/06
U.S. Cl. 99—174 17 Claims



A hermetically sealed package and method of making the same which package includes a breakaway or peelable seal formed between an ethylene-polar monomer copolymer film or coating material, such as, ethylene-vinyl acetate, and a thermoplastic film, such as, polyvinylidene chloride. Preferably, during seal formation, the seal interface is heated to a temperature between the melt temperatures of the film

materials which make up the seal to provide improved sealing without destroying the breakaway property or peelability of the seal so formed.

3,647,486

METHOD OF PREPARING CANNED COOKED RICE

Charles I. Tollefson, and Claude W. Bice, both of Rochester, N.Y., assignors to The R. T. French Company, Rochester, N.Y.

Filed Apr. 3, 1968, Ser. No. 718,333
Int. Cl. A23b 7/00
U.S. Cl. 99—186 2 Claims

Raw rice is cooked in acidified water at a temperature above the gelatinization point of starch but below the boiling point of water for a sufficient period to achieve a moisture content between 58 and 65 percent. The cooked rice is then canned and the cans sealed and sterilized. Then the cans are cooled and the product is allowed to remain in the cans ("aged") for several days before consumption.

3,647,487

TWO-STEP METHOD FOR PRODUCING STERILIZED GROUND SPICES

Louis Sair, Evergreen Park, Ill., assignor to The Griffith Laboratories, Inc., Chicago, Ill.

Filed Aug. 5, 1968, Ser. No. 749,997
Int. Cl. A23l 3/34
U.S. Cl. 99—225 6 Claims

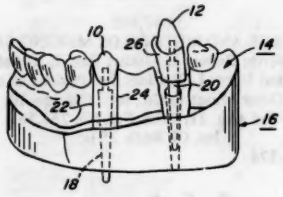
Spices are effectively sterilized without the formation of untoward quantities of ethylene chlorohydrin by subjecting whole, unground spices to an atmosphere of ethylene oxide, which is effective to substantially kill the bacteria on the surface of the spices, grinding the thus treated spices, and finally subjecting the ground spices to an atmosphere of propylene oxide which is effective to substantially kill the remaining bacteria or any bacteria picked up during the grinding step.

3,647,488

DENTAL PROSTHESIS MODEL BASE COMPOSITION CONTAINING CALCIUM FLUORIDE

Kristin Brigham, New York, and Ronald C. Vickery, Northport, both of N.Y., assignors to Ceramco, Inc., Long Island City, N.Y.

Filed Nov. 4, 1969, Ser. No. 873,790
Int. Cl. A61k 5/00; C04b 35/04, 35/66
U.S. Cl. 106—35 4 Claims



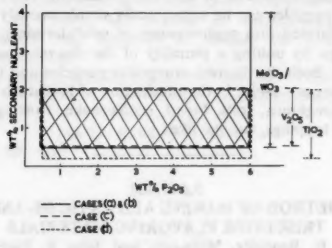
A composition and method for preparing model bases in the manufacture of dental prostheses, in which the model base is made of a castable-refractory composition that is stable at high temperatures and is compatible with commercially available dental porcelains and gold alloys, as well as with the implaced dies and dowels. The catable-refractory composition of the invention is made by a dry blend consisting essentially of 40–50 weight percent of a refractory oxide, 6–8 percent by weight of an alkali phosphate, and 42–47 percent by weight of an alkaline-earth fluoride, and then mixing that dry blend with a colloidal silica sol of 40 weight percent content, using a ratio of 4 to 5 parts of blend to 1 part of sol.

3,647,489

GLASS CERAMICS

Peter William McMillan, and Graham Partridge, both of Stafford, England, assignors to The English Electric Company, Limited, London, England

Continuation of application Ser. No. 636,267, May 5, 1967, now abandoned, Continuation-in-part of application Ser. No. 552,422, May 24, 1966, now abandoned, Continuation-in-part of application Ser. No. 283,371, May 27, 1963, now abandoned, Continuation-in-part of application Ser. No. 201,718, June 11, 1962, now abandoned. This application Aug. 13, 1969, Ser. No. 849,794. The portion of the term of this patent subsequent to Nov. 14, 1984, has been disclaimed. Claims priority, application Great Britain, June 20, 1961, 22,232/61
Int. Cl. C04b 33/00; C03b 29/00
U.S. Cl. 106—39 DV 8 Claims



A high-alumina glass-ceramic product with a substantial proportion microcrystalline is formed from a glass by thermal treatment, the main crystal phase being beta-spodumene or beta-eucryptite, and the product having a thermal coefficient of expansion of less than 40×10^{-7}/°C. At least 90 percent of the composition comprises major constituents and nucleating agents as follows, in percentages by weight:

Major constituents:	
SiO_2	55–75
Al_2O_3	15–30
Li_2O	2–15
MgO	0–20

Nucleating agents: P_2O_5, 0.5–6.0 percent, together with one of the following metallic oxides:

(a) MoO_3	0.5–4.0
(b) WO_3	0.5–4.0
(c) V_2O_5	0.5–2.0
(d) TiO_2	0.2–less than 2.

The thermal coefficient of expansion is less than 40×10^{-7}. An alternative nucleating agent is cadmium sulpho-selenide.

3,647,490

OPALIZABLE BOROSILICATE GLASS COMPOSITIONS

Perry P. Pirooz, Toledo, Ohio, assignor to Owens-Illinois, Inc.

Continuation of application Ser. No. 653,404, July 14, 1967, now abandoned. This application May 15, 1970, Ser. No. 37,540
Int. Cl. C03c 3/04
U.S. Cl. 106—54 5 Claims

A system of thermally opalizable glass compositions, suitable for use in making opal glass containers and low-expansion, heat-resistant ovenware consisting essentially of SiO_2, Al_2O_3, B_2O_3, CaO, MgO and Na_2O in specified critical amounts. The thermally opalizable glass compositions that

can be used to form glass containers at low cost by conventional high-speed glass-forming techniques have the following ingredients in approximate percentages by weight:

Ingredients	Percent
SiO_2	66–69
Al_2O_3	6
B_2O_3	4– 8
CaO + MgO	13–18
Na_2O	5

in which the weight percent ratio of CaO:MgO is about 1.4. Preferably, an article is formed of the above glass composition, and heat-treated to provide an in situ glass-in-glass phase separation by maintaining the article at a temperature in the neighborhood of 1,050° to 1,500° F. for about 1/4 to 8 hours.

3,647,491

SINTERED BOROSILICATE GLASS

Wilhelm Baum, Mainz-Mombach, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Dec. 23, 1969, Ser. No. 887,576

Claims priority, application Germany, Dec. 24, 1968, P 18 16 855.3

Int. Cl. C04c *3/04*

U.S. Cl. 106—54 **2 Claims**

Sintered glass consists essentially of 60% to 62% by weight of SiO_2, 22% to 25% by weight of B_2O_3, 8% to 10% by weight of Na_2O, 3.5% to 5% by weight of Al_2O_3 and at least one of the following: 0% to 1.5% by weight of K_2O, 0% to 2.5% by weight of CaO, 0% to 1% by weight of MgO, 0% to 3% by weight of BaO, 0% to 1% by weight of Li_2O and 0% to 2% by weight of ZnO.

3,647,492

METHOD OF MAKING COLORED PIGMENTS HAVING PEARLESCENT QUALITIES

Douglas W. Chapman; Richard Dean Overley; Robert D. Rands, Jr., and Ronald S. Schreiber, all of 3600 North Second St., St. Louis, Mo.

Continuation-in-part of application Ser. No. 15,887, Mar. 2, 1970. This application Nov. 20, 1970, Ser. No. 91,585

Int. Cl. C08h *17/04*; C09c *1/00*

U.S. Cl. 106—291 **11 Claims**

Pearlescent substrate may be modified with finely divided insoluble pigments by dispersing an adhesive binder substance in an aqueous suspension of the said substrate and pigment, effecting precipitation of the said binder, and recovering from the reaction mixture a modified, e.g., colored, product which substantially retains the pearlescent luster of the substrate. The product comprises the said substrate to which particles of the finely divided pigment are intimately bound by means of the binder. For example, the substrate may be a pearlescent bismuth oxychloride. The binder material may be selected from fatty acids or insoluble salts of fatty acids, silicic acid or insoluble salts of silicic acid, insoluble salts of alginic acid or suitable water-dispersible polymeric adhesives. Simple mixtures of the base with the pigment but without the binder of the present invention generally fail to exhibit the pearlescent qualities of the unpigmented substrate.

3,647,493

METHOD AND APPARATUS FOR CONTINUOUSLY PRODUCING SOLUTIONS AND SUSPENSIONS

Walter Gresch, Muttenz; Horst Pilch, Pratteln, and Erwin Ruttener, Rihen, all of Switzerland, assignors to Buss AG, Basel, Switzerland

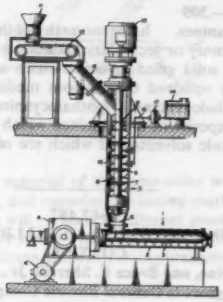
Continuation-in-part of application Ser. No. 600,538, Dec. 9, 1966. This application Nov. 12, 1969, Ser. No. 875,962

Claims priority, application Switzerland, Dec. 20, 1965, 17696/65

Int. Cl. C08b *27/48*

U.S. Cl. 106—187 **3 Claims**

A novel method and apparatus for continuously producing chemical solutions and suspensions is disclosed. The novel invention serves to effect a continuous dissolving process of a chemical solute in a solvent and does so in a fashion which prevents the formation of agglomerates and jellylike skin on the particles and serves to dissolve or suspend such materials without introducing high sheer force into the product. In a



preferred embodiment, the novel invention contemplates to effect a high-speed whirling or fluffing of the particles and, at the same time, to impart a positive downward movement thereto. The solvent is then sprayed into the whirling mass at different stepwise spaced locations along the direction of downward movement of the particles, which particles or mass, now full wetted, are then continuously agitated at a relatively low speed providing mild agitation and kneading and a dwell time sufficient for the time required for the dissolving or suspension reactions to complete.

3,647,494

PROCESS FOR MAKING SOLID SOLUTIONS OF QUINACRIDONE AND DERIVATIVES THEREOF

Felix Frederick Ehrich, Westfield, N.J., and William J. Marshall, Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of application Ser. No. 515,229, Dec. 20, 1965, now abandoned. This application Aug. 27, 1969, Ser. No. 853,530

Int. Cl. C08h *17/02*

U.S. Cl. 106—288 Q **6 Claims**

A solid solution of a quinacridone and the quinacridonequinone corresponding thereto is made by a process including the step of digesting, in the temperature range of 50° C. to the boil, an aqueous, acidic dispersion of the quinacridone in comminuted condition in the presence of an amount of a chromate oxidizing agent stoichiometrically sufficient to oxidize a desired proportion of the quinacridone to quinacridonequinone.

3,647,495

TITANIUM DIOXIDE PIGMENT HAVING IMPROVED DISPERSIBILITY IN COATING COMPOSITIONS

Charles W. Cline, Somerville, N.J., assignor to N L Industries, Inc., New York, N.Y.

Filed Jan. 29, 1970, Ser. No. 6,949

Int. Cl. C09c *1/36*

U.S. Cl. 106—300 **6 Claims**

A highly dispersible titanium dioxide pigment which may or may not be coated with a hydrous oxide such as alumina, titania or silica and mixtures thereof contains a coating of from 0.35 to 1.50 percent 2,2,4-trimethyl-1,3-pentanediol on pigment weight basis.

3,647,496

PIGMENT COMPOSITIONS

Satish Kumar Bagai, and Arthur Topham, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Apr. 6, 1970, Ser. No. 26,167
Claims priority, application Great Britain, Apr. 9, 1969, 18,215/69
Int. Cl. C08h 17/14
U.S. Cl. 106—309 10 Claims

Phthalocyanines, halogenomethylphthalocyanines and aliphatic primary or secondary amines are milled together in presence of solid grinding acids which are soluble in, and subsequently removed by, aqueous media. Reaction of the amines and halogenomethylphthalocyanines takes place and pigment compositions are obtained which are readily dispersible in organic solvents and which are of value in inks and paints.

3,647,497

MASKING METHOD IN METALLIC DIFFUSION COATING

David J. Levine, and Bruce E. Sherrill, Jr., both of Cincinnati, Ohio, assignors to General Electric Company

Filed Nov. 29, 1968, Ser. No. 780,176
Int. Cl. C23c 11/08; B44d 1/52
U.S. Cl. 117—5.5 3 Claims

A metallic article surface, not intended to be coated during a metallic diffusion coating method employing a halide vapor to carry coating elements, is protected with a masking material including a compound which has an energy of formation less than the energy of formation of a halide of a metallic element of the compound. Examples of the compound are the oxides of Ca, Mg and Ba.

3,647,498

PROCESS FOR PRODUCTION OF DENTAL CROWNS

Emery W. Dougherty, Milford, Del., assignor to Dentsply International Inc., York, Pa.

Filed Mar. 27, 1970, Ser. No. 23,483
Int. Cl. A61c 5/08; B44c 1/22; B44d 1/36
U.S. Cl. 117—8 7 Claims

A dental composition in the form of a thickened paste comprising: A. a solid phase consisting essentially of polymers and copolymers of esters of methacrylic acid with average particle diameters of 10–200 microns and a glass transition temperature of approximately 75° C. or less, and B. a polymerizable liquid phase consisting essentially of 1. from 70 to 90 percent by weight of a polyglycol dimethacrylate or diacrylate and 2. 10 to 30 percent by weight of bisphenol A dimethyacrylate. Such a thickened dental composition based upon acrylic resins can be used for dental crowns and inlays, particularly as produced by the coating of noble metal crown with subsequent heating to set the coating and shaping to match that of a natural tooth. The presence of a minor amount of bisphenol A dimethacrylate provides the composition with the ability to provide porosity free, strong, hard and stiff moldings with reduced plasticization by water.

3,647,499

PROCESS FOR TRANSFERRING DRY DEVELOPED ELECTROGRAPHIC IMAGES

Ralph C. Colt, and Kenneth F. Seil, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 19, 1969, Ser. No. 851,440
Int. Cl. G03g 13/16
U.S. Cl. 117—17.5 12 Claims

A process of transferring dry developed electrographic images is described which results in the transfer of substantially all of the toner powder from an image-bearing element to a receiver sheet. This process involves moistening the receiver prior to placing it in contact with the dry element bearing a developed image. This process is useful in forming lithographic printing plates.

3,647,500

OIL-FREE SLIDER BEARING MATERIAL AND METHOD OF MAKING THE MATERIAL

Koichi Mizuno, Tokyo, Japan, assignor to Taiho Kogyo Co., Ltd., Toyota, Japan, a part interest

Filed Sept. 8, 1969, Ser. No. 856,003
Claims priority, application Japan, Apr. 24, 1969, 44/31260
Int. Cl. B44d 1/094, 1/14
U.S. Cl. 117—21 8 Claims

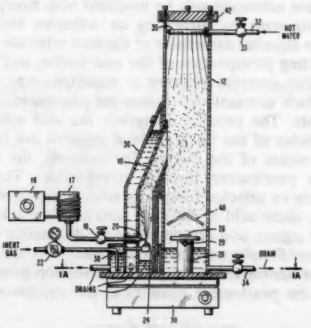
An oil-free bearing material formed on a substrate metal surface, which consists of a porous resin layer integrally sintered with the metal surface, and wherein the said resin consists essentially of one member selected from the group consisting of polycarbonate, polysulfone, and polyphenylene oxide. The resin layer additionally contains up to 30 weight percent of at least one porosity-improving auxiliary ingredient selected from the group consisting of particles of polytetrafluoroethylene, glass and graphite. The porous resin layer additionally includes mineral wax impregnated therein. A method of making the bearing material comprising the steps of wetting desired portions of the metal surface with a solution of the resin dissolved in a solvent thereof, scattering powder particles of the resin onto said portions of the metal surface thus wet, and sintering the metal surface with the resin powder particles to form a porous resin layer integrally sintered directly on the metal surface.

3,647,501

METHOD FOR PRODUCING PHOTOGRAPHIC EMULSION COATINGS

Robert L. Buckingham, Hawthorne, and Harold H. Herd, Ossining, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1969, Ser. No. 887,688
Int. Cl. B44d 1/08; G03c 1/74; B05b 1/28
U.S. Cl. 117—34 5 Claims



A surface of an object is coated with a uniform thickness of a photographic emulsion. In the coating method, there is utilized an apparatus which comprises a smaller substantially enclosed chamber which communicates at its upper end with a vertical open larger chamber. Jet streams of liquid emulsion droplets and an inert gas are introduced into the smaller chamber. By elutriation, larger droplets fall to the bottom of the smaller chamber and droplets sufficiently small in accordance with Stokes law pass into the larger chamber. Here, those droplets which are small enough according to Stokes law for the larger chamber rise to leave the larger chamber

from its open end and droplets having a size large enough to descend according to Stokes law settle on the surface of an object positioned within and at the base of the larger chamber to form the emulsion coating on the surface.

3,647,502

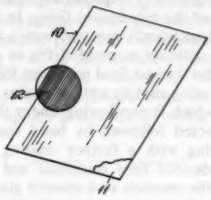
PRESSURE-SENSITIVE TRANSFER ELEMENTS

Douglas A. Newman, Glen Cove, N.Y., assignor to Columbia Ribbon and Carbon Manufacturing Co., Inc., Glen Cove, N.Y.

Continuation-in-part of application Ser. No. 639,374, May 18, 1967, now abandoned. This application Nov. 3, 1969, Ser. No. 873,391

Int. Cl. B41m *5/10*

U.S. Cl. 117—36.1 **2 Claims**



Pressure-sensitive transfer elements for the pressure placement of automatically sensible images comprising a multiplicity of evenly visually spaced vertical columns of sensible composition capable of generating a multiplicity of voltage signals characteristic of each image being sensed, and the method of sensing such images.

3,647,503

MULTICOLORED HEAT-TRANSFER SHEET AND PROCESSES FOR HEAT TRANSFER OF MULTICOLORED INK IMPRESSIONS

Takashi Mizutani; Masao Anzai, and Akio Ebihara, all of Tokyo, Japan, assignors to Toppan Printing Company, Limited, Tokyo, Japan

Filed Aug. 8, 1969, Ser. No. 848,703

Claims priority, application Japan, Dec. 18, 1968, 43/84387; Apr. 9, 1969, 44/27397; 44/27398

Int. Cl. B41c *1/06*; B44d *1/14*

U.S. Cl. 117—36.4 **12 Claims**

Processes for the transfer of multicolored ink impressions by the application of heat and the multicolored heat-transfer sheets which enable these processes to be carried out. A sheet is printed on with a plurality of layers having ink impressions, each layer comprising one of a number of color agents which are respectively distributed in a dry solid resinous binder. The color agents are selected for their sublimation characteristics and said binder includes a quantity of a filler to cause each of said printed layers of inks to be porous to be able to pass the vaporized color agents. The layers are printed in successive order such that the binders have progressively different porosities and/or the color agents possess progressively different sublimation characteristics.

3,647,504

PRESSURE SENSITIVE LAMINATE

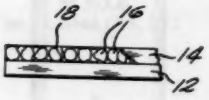
Edward J. Hayes, Jr., and Brian Hayes, both of 1801 Arlington Blvd., Ann Arbor, Mich.

Filed Aug. 19, 1969, Ser. No. 851,335

Int. Cl. B41m *5/00*

U.S. Cl. 117—36.7 **1 Claim**

A pressure sensitive laminate comprising a backing sheet and a coating consisting of a profusion of capsules, each capsule containing a material, such as a liquid material, capable of marking a certain color. The capsules are constructed so that they will rupture in response to the application of a predetermined compressive pressure and when ruptured will release the marking material therein. All of the capsules con-



taining a marking material of the same color will rupture at the same pressure, and capsules containing marking material of different colors will rupture at different pressure, thereby enabling marking of a part which is used to apply pressure to the laminate to indicate areas of varying pressure on the part.

3,647,505

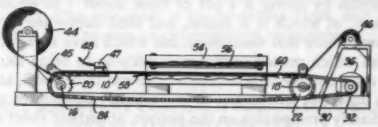
METHOD OF FORMING FRICTION PROTRUSIONS ON ELASTIC, OPEN-MESH GARMENT FABRIC

Knut L. Bjorn-Larsen, 128 South Hacienda Ave., Glendora, Calif.

Continuation of application Ser. No. 830,193, May 19, 1969, now abandoned , which is a continuation of application Ser. No. 494,822, Oct. 11, 1965, now abandoned. This application Aug. 10, 1970, Ser. No. 62,604

Int. Cl. B05c *8/04*, *11/14*

U.S. Cl. 117—37 R **15 Claims**



A method of applying a resinous material to an elastic, open-mesh fabric in spaced globs or in a narrow band and subsequently passing the fabric to an area maintained at an elevated temperature so as to set the resinous material and thus form friction protrusions on the open-mesh fabric.

3,647,506

METHOD OF AND APPARATUS FOR BURNING GRADUATIONS SYMBOLS AND LETTERING INTO GLASS ARTICLES

Erich Greil, Wertheim, Germany, assignor to Forschungsgemeinschaft fur technisches Glas e.V., Wertheim, Germany

Filed July 12, 1968, Ser. No. 744,466

Claims priority, application Germany, July 14, 1967, P 15 96 803.3

Int. Cl. C03c *17/22*, *17/26*

U.S. Cl. 117—37 R **7 Claims**

The invention provides a method of and apparatus for burning graduations, symbols and lettering into glass articles by using a glass substrate and a marking enamel or stain which have different absorptions for light and radiant heat in

such a way that firing by radiation heating between 400×10^{-9} m. and $2,500\times10^{-9}$ m. raises the temperature of the colored

areas on the glass above that of the glass substrate itself by about 150° C.

3,647,507

RESIN COMPOSITION CONTAINING A POLYACRYLIC ACID-POLYACRYLAMIDE COPOLYMER AND METHOD OF USING THE SAME TO CONTROL RESIN COMPOSITION

Charles Ray Ashcraft, Salt Lake City, Utah, assignor to Johnson & Johnson

Filed Jan. 7, 1970, Ser. No. 1,299

Int. Cl. B44d *1/092, 1/52*

U.S. Cl. 117—38 **13 Claims**

A new resin composition comprising an emulsion polymerized resin, a surfactant, and a polyacrylic acid-polyacrylamide copolymer; and a method of controlling the deposition of such resin composition on porous, absorbent materials by giving it a pH of from about 7 to about 9, or greater, at which it is stable, and then depositing it on the porous, absorbent sheet materials which have a pH of below 7 and which possess sufficient acidity as to bring the pH of the resin composition deposited thereon to below 7, at which it is unstable, whereupon it immediately coagulates and immediately precipitates on the porous, absorbent sheet materials with a minimum of lateral spread or migration thereon.

3,647,508

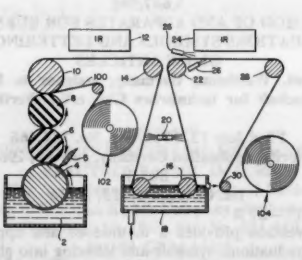
METHOD OF MAKING PATTERNED METAL COATINGS BY SELECTIVE ETCHING OF METAL

John H. Gorrell, Billerica, Mass., assignor to King-Seeley Thermos Co., Ann Arbor, Mich.

Filed Aug. 27, 1968, Ser. No. 755,627

Int. Cl. B44c *1/22*

U.S. Cl. 117—38 **8 Claims**



Web substrates (such as plastic film) are coated with metal (as by vacuum aluminizing) and etched in selected areas of the metal coating. The etching medium comprises an etchant, a body-forming member to trap the etchant, a volatile carrier and a dispersing member which holds the etchant and body-forming member in intimate mixture.

3,647,509

METHOD OF PRODUCING PORCELAIN ENAMEL COATINGS

John E. Keiser, Findlay, and Earl Krieger, Rawson, both of Ohio, assignors to Whirlpool Corporation

Filed May 8, 1970, Ser. No. 35,610

Int. Cl. C23d *5/00;* **B44d** *1/14*

U.S. Cl. 117—45 **9 Claims**

A method of applying porcelain enamel to a ferrous enameling sheet stock which permits the use of an electrostatic spray in the method and which further permits eliminating the commonly required application of a ground coat of enamel and the subsequent firing. In this new method the stock is electrostatically sprayed with a flowable enamel material such as a liquid suspended frit to a thickness of a fraction only of the desired final thickness followed by drying this fractional coating slightly until it attains a self-sustaining setup condition which is nonflowing under the conditions to which it is subjected followed by hand spraying over this preliminary coating with a further coating of the enamel material to the desired final thickness and then firing the coatings to flow the enamels to a smooth glassy surface condition. This method is particularly applicable to applying two colors of porcelain enamel to ferrous stock in which one color blends smoothly into the other.

3,647,510

POLYSULFONES COATED WITH ORGANOPOLYSILOXANES

Donald W. Gagnon, Sylvania, and James J. Tillman, Toledo, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed June 9, 1969, Ser. No. 831,752

Int. Cl. B44d *1/092, 5/04*

U.S. Cl. 117—46 FC **10 Claims**

Process, and the article produced thereby, for providing a hard, acetone-resistant and mar-resistant coating on articles having a polysulfone surface by applying to the surface a solvent-soluble, further curable organopolysiloxane in an organic solvent and thereafter evaporating the solvent and finally curing the organopolysiloxane. The solvent-soluble, further curable organopolysiloxane is made by heating methyltrialkoxysilane or a mixture of methyltrialkoxysilane and phenyltrialkoxysilane and water in the presence of a hydrolysis catalyst at a sufficient temperature and for a suitable time to form a partial condensation product, concentrating this product by heating it to remove some alkanol byproduct and water and thereafter heating the product below the gel point thereof to provide the solvent soluble, further curable organopolysiloxane.

3,647,511

METHOD OF PREPARING CURVED PYROLYTIC GRAPHITE BODIES HAVING INCREASED THICKNESS TO RADIUS RATIOS

Thomas J. Clark, Birmingham, and Howard W. Brown, St. Clair Shores, both of Mich., assignors to General Electric Company

Continuation of application Ser. No. 520,213, Jan. 12, 1966, now abandoned. This application Mar. 20, 1969, Ser. No. 834,183

Int. Cl. C23c *11/08*

U.S. Cl. 117—46 CG **5 Claims**

Curved pyrolytic graphite bodies of increased thickness-to-radius ratios are produced by codepositing with the pyrolytic graphite a refractory element in progressively decreasing quantities from the outer to the inner surface of the body. The addition of the refractory alloy metal has been found to

lower the stress levels and hence permit greater thicknesses of the pyrolytic graphite body.

3,647,512

PRETREATMENT OF MOLDED POLYOLEFINS FOR ELECTROLESS PLATING

John J. Grunwald, New Haven, and Eugene D. D'Ottavio, Thomaston, both of Conn., assignors to MacDermid Incorporated, Waterbury, Conn.

Original application Mar. 28, 1968, Ser. No. 717,006, now Patent No. 3,567,649. Divided and this application July 2, 1970, Ser. No. 52,090

Int. Cl. B44d *1/092, 1/02*

U.S. Cl. 117—47 A 6 Claims

The invention discloses compositions for and methods of treating the surface of molded polyolefins, more especially polypropylene, polyethylene and polybutylene, prior to the deposition of a metallic plate thereon in order to improve the adherence of the plate to the surface of the polyolefin substrate. The compositions comprise stable, aqueous microemulsions of the oil-in-water-type containing as the principal active agents a mixture of white phosphorus and trichloroethylene.

3,647,513

METHOD FOR IMPROVING THE ADHESION OF POLYESTER COMPOSITIONS

William E. Jackson, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of application Ser. No. 689,759, Dec. 12, 1967, now abandoned. This application Oct. 26, 1970, Ser. No. 84,219

Int. Cl. B44d *1/092*

U.S. Cl. 117—47 A 8 Claims

This invention relates to a method of improving the adhesion of a polyester composition to itself or to metals. This is achieved by treating the surface of the polyester composition with a treating agent preferably in a solvent to enhance the bond strength between isocyanate-type adhesives and the surface of the polyester composition. The treating agent is a tertiary amine of the aliphatic, cycloaliphatic and aromatic-type.

3,647,514

SURFACE-PRETREATMENT OF ARTICLES MADE FROM POLYETHYLENE OR POLYPROPYLENE OR CORRESPONDING COPOLYMERS FOR CHEMICAL NICKEL-PLATING

Michael Ahlgrim, Bliesheim; Joachim Kandler, Lechenich; Hans-Joachim Lenz, Lorsbach Taunus; Gerhard Mietens, Efferen near Cologne, and Willy Ott, Lorsbach Taunus, all of Germany, assignors to Knapsack Aktiengesellschaft, Knapsack near Cologne, Germany

Filed Aug. 12, 1969, Ser. No. 849,517

Claims priority, application Germany, Aug. 28, 1968, P 17 94 029.3

Int. Cl. C23c *3/02*

U.S. Cl. 117—47 A 8 Claims

Pretreatment of surfaces of articles made from polyethylene or polypropylene or corresponding copolymers for chemical nickel-plating. The surface of the article is treated using a pickling solution of concentrated sulfuric acid or a combination of said acid with concentrated phosphoric acid, sensitized using an aqueous $SnCl_2$ solution, and activated using an aqueous solution containing one or more noble metal salts. The pickling step is carried out at a temperature of between about 75° and 95° C., using a pickling solution containing one or more noble metal salts in a concentration between about 0.1 and 0.5 gram per liter.

3,647,515

PROCESS FOR TREATING WINDSHIELDS OF ORGANIC GLASS AND, RESPECTIVELY, THE OUTER LAYERS THEREOF

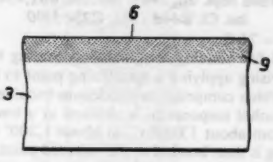
Hans-Jurgen Wilhelm Hahn, Hamburg, Germany, assignor to Hamburger Flugzeugbau GmbH

Filed Sept. 30, 1968, Ser. No. 763,818

Claims priority, application Germany, Sept. 29, 1967, P 16 94 393.4

Int. Cl. B44d *1/18, 5/12*

U.S. Cl. 117—62 6 Claims



An airplane windshield in the cockpit made of organic glass provided with a reliably effective antistatic coating which can withstand any external influences on a permanent basis and for preventing static charges under adverse weather and flight conditions, having its surfaces treated with bromine vapor, diluted bromine solution and/or other halogens.

3,647,516

AIR-DRIED POLYESTER COATING AND APPLICATION

Kenneth N. Edwards, 1130 Rossmoyne Ave., Glendale, Calif.

Filed Oct. 27, 1969, Ser. No. 869,873

Int. Cl. B44d *1/26;* C09d *3/68*

U.S. Cl. 117—64 9 Claims

An air-dried polyester coating which is adapted to be applied in successive layers with a very short time interval between applications and which cures to a sandable hardness very rapidly. The polyester is an air-drying resin, and it is cross-linked with bromo- or chlorostyrene monomer.

3,647,517

IMPACT RESISTANT COATINGS FOR COBALT-BASE SUPERALLOYS AND THE LIKE

Thomas Milidantri, Spring Valley, and Harry W. Brill-Edwards, New York, both of N.Y., assignors to Chromalloy American Corporation, Orangeburg, N.Y.

Filed June 22, 1970, Ser. No. 48,515

Int. Cl. C23c *9/02*

U.S. Cl. 117—71 M 16 Claims

In the production of impact and oxidation resistant metal coatings on superalloy substrates, e.g., cobalt-base superalloys, by pack cementation, such as a nickel aluminide coating, the improvement wherein nickel is first diffusion coated onto the substrate from a pack containing a small but effective amount of sulfur as a metal transfer agent, following which the nickel coated substrate is then coated with another metal, such as aluminum.

3,647,518

CRYSTAL PAPER HAVING METALLIC LUSTER

Hisao Imai, Fuji, Japan, assignor to Goji Paper Mfg. Co., Ltd., Fuji-shi, Shiguoka-ken, Japan

Filed Dec. 3, 1969, Ser. No. 881,863

Claims priority, application Japan, Sept. 12, 1969, 44/72519

Int. Cl. B32b *29/04*

U.S. Cl. 117—71 R 10 Claims

A crystal paper having a metallic luster which is prepared by uniformly dispersing (A) either (1) crystals of an inorganic metal salt or (2) a crystalline organic compound and (B) metal powder together with (C) a film-formable sub-

stance, onto a supporting paper having a smooth surface. Two layers may be applied to the paper with metal flakes being present in one of the layers.

3,647,519

METHOD FOR METALLIZING BERYLLIUM OXIDE AT LOW TEMPERATURES

John M. White, Gainesville, Fla., assignor to Sperry Rand Corporation

Filed Sept. 26, 1969, Ser. No. 861,454
Int. Cl. B44d *1/02*; C23c *3/00*
U.S. Cl. 117—71 R 1 Claim

A method for bonding a metallizing coating to beryllium oxide comprising applying a metallizing paint to the beryllia. The paint, which comprises molybdenum trioxide and a glass frit in an alcohol suspension, is sintered at a temperature in the range from about 1,000° C. to about 1,200° C. A metallizing coating is then bonded to the sintered paint.

3,647,520

ELECTRON BEAM CROSS-LINKING OF COATING COMPOSITIONS CONTAINING ETHYLENE UNSATURATED CARBOXYLIC ACID COPOLYMERS AND A MELAMINE COMPOSITION

Vishnu J. Gor, Blue Island, and Ernesto H. Manuel, Park Forest, both of Ill., assignors to Continental Can Company, Inc., New York, N.Y.

Filed July 6, 1970, Ser. No. 52,722
Int. Cl. B44d *1/50*
U.S. Cl. 117—93.31 8 Claims

A process for coating articles wherein a thin film containing a mixture of a copolymer of ethylene and an ethylenically unsaturated carboxylic acid and a melamine composition is applied to the surface of the article and the film mixture cross-linked to form a hardened coating by irradiation with a beam of high-energy electrons.

3,647,521

HYDRODYNAMIC FORMING

Marshall P. Tulin, Bethesda, Md., assignor to Hydronautics, Incorporated, Laurel, Md.

Original application Feb. 21, 1968, Ser. No. 707,258, now Patent No. 3,592,763. Divided and this application Jan. 8, 1970, Ser. No. 7,307
Int. Cl. B44d *1/09*, *1/02*
U.S. Cl. 117—95 9 Claims

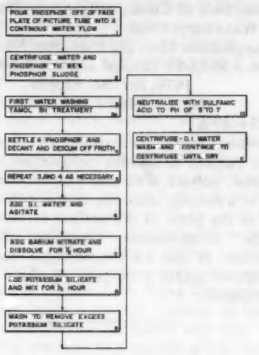
A hydrodynamic method and apparatus are provided for forming tubular members useful in reverse-osmosis apparatus. A conventional film-forming liquid is forced through a tubular support by a pressurized column of gas to form a film of liquid on the inner wall of the tube. The liquid is then cured to solidify the film of liquid in tubular form. The disclosed hydrodynamic method and apparatus make possible an advantageous reverse-osmosis process and apparatus for recovering water of a low-salt concentration from saline water. Tubular membranes are hydrodynamically formed within a porous tubular support to form a porous structure, and saline water is supplied under pressure to the interior of the resulting structure to recover water having a low-salt concentration outside of the tubular support. When it becomes necessary to replace the tubular membrane, the supply of saline water is discontinued and a solvent is forced axially along the tubular membrane to dissolve it. Subsequently, the tubular membrane is hydrodynamically regenerated and the reverse-osmosis operation can be resumed.

3,647,522

METHOD OF RECLAIMING AND COATING PHOSPHOR

David Single, Chicago, Ill., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Apr. 29, 1970, Ser. No. 33,001
Int. Cl. H01j *1/63*; C09k *1/04*
U.S. Cl. 117—100 B 11 Claims


POUR PHOSPHOR OFF OF FACE PLATE OF PICTURE TUBE INTO A CONTINOUS WATER FLOW
CENTRIFUGE WATER AND PHOSPHOR TO RE'S PHOSPHOR SLUDGE
FIRST WATER WASHING TANIC, RE TREATMENT
NEUTRALIZE WITH SULFAMIC ACID TO PH OF 6 TO 7
SETTLE & PHOSPHOR AND DECANT AND DESCUM OFF FROTH
CENTRIFUGE - D.I. WATER WASH AND CONTINUE TO CENTRIFUGE UNTIL SPH
REPEAT 3 AND 4 AS NECESSARY
ADD D.I. WATER AND AGITATE
ADD BARIUM NITRATE AND DISSOLVE FOR ½ HOUR
1.0% POTASSIUM SILICATE AND MIX FOR ½ HOUR
WASH TO REMOVE EXCESS POTASSIUM SILICATE

A method for reclaiming blue and green phosphor after it is used to form part or all of a coating on the faceplate of a color television picture tube so that such phosphor can be reused, and a method for applying a silicate coating to such phosphor particles with improved characteristics by suspending the phosphor particles in a solution of barium nitrate forming an ionic coating about the particles and then adding potassium silicate to the solution which molecularly and adhesively bonds to the surface of the phosphor particles to coat the same.

3,647,523

COATED CHLORINE-GENERATING MATERIALS FOR TREATING FLUIDS

Roland J. Horvath, South Euclid, and Charles G. Parsons, Mentor, both of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Aug. 28, 1969, Ser. No. 853,967
Int. Cl. C01b *11/06*
U.S. Cl. 117—100 B 8 Claims

Coatings for chlorine-containing compositions which control the rate of chlorine release from the composition when contacted with fluid medium, minimize the release of noxious chlorine odors to the atmosphere and improve the storage of the composition. The coating is established on the chlorine-containing composition by contacting the composition with a solution of the coating agent and allowing the coating agent to air dry on the composition.

3,647,524

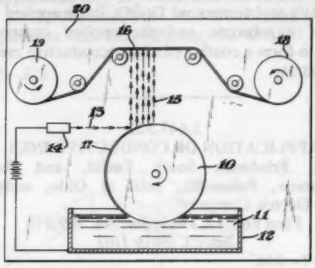
VAPOR PHASE METAL PLATING PROCESS

Robert O. Lindblom, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed July 18, 1969, Ser. No. 848,136
Int. Cl. C23c *13/00*, *13/02*
U.S. Cl. 117—107.1 1 Claim

A process for the uniform evaporation of metals is accomplished by rotating a substantially cylindrical refractory element through a source of molten metal to coat the surface of said element with a thin film of molten metal, heating a portion of the molten metal coated surface of the refractory element to a temperature sufficient to vaporize at least a portion of the metal thereon. Condensing the metal vapors thus

produced on a cooler substrate produces a solid metal film thereon. Passing the metal vapors into a cooler space con-



taining an inert gas under low pressure or submicroscopic nucleic particles produces metal powders.

3,647,525

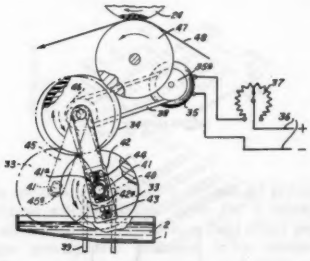
METHOD AND MEANS FOR APPLYING LIQUID TO A MOVING WEB

Harold P. Dahlgren, Dallas, Tex., assignor to Dahlgren Manufacturing Company, Inc., Dallas, Tex.

Continuation-in-part of application Ser. No. 600,650, Dec. 9, 1966, which is a continuation of application Ser. No. 414,574, Nov. 30, 1964, now abandoned , and a continuation-in-part of 26,035, May 2, 1960, now Patent No. 3,168,037, and a continuation-in-part of 844,372, Oct. 5, 1959, now abandoned. This application Apr. 26, 1967, Ser. No. 633,799

Int. Cl. B41l *43/02*

U.S. Cl. 117—111 **46 Claims**



A method and apparatus for applying a controlled quantity of liquid to a moving web of liquid receptive material comprising a smoothly finished hydrophilic transfer roller in rotative pressure engagement with the web. Pressure between a smooth surfaced metering roller and the transfer roller is adjustable to accurately control the thickness of a film of fluid having low viscosity which is delivered by the transfer roller to the web. The relative surface speeds of the transfer roller and the web are adjustable to control the rate at which the metered film is delivered to the web and to control the hydraulic pressure exerted to the film to urge it into the web. A backup roller is employed to further control the hydraulic pressure of fluid transferred to the web. The metering roller and the transfer roller are skewed to regulate the moisture profile across the width of the web.

3,647,526

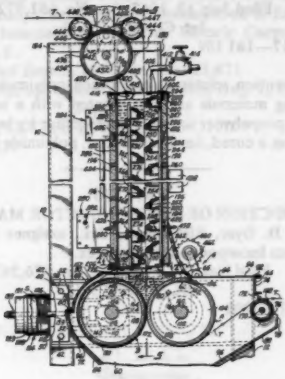
METHOD FOR TREATING TEXTILE MATERIALS

Donald A. Barnes, Route 1, Templeton Road, Mooresville, N.C.

Original application May 13, 1966, Ser. No. 549,894, now Patent No. 3,465,716, dated Sept. 9, 1969. Divided and this application July 17, 1969, Ser. No. 842,640

Int. Cl. B65g *49/04*; B05c *3/12*

U.S. Cl. 117—115 **12 Claims**



The method of treating textile material by passing the same under tension through a body of treating liquid in a treating zone while applying rubbing contact to the textile material at staggered points on opposite sides thereof and while subjecting the treating liquid and points of rubbing contact to vibration. A constant head of the treating liquid is maintained in the treating zone by adding treating liquid to the zone at a rate faster than it is being absorbed by the textile material. The excess treating liquid is collected, filtered and returned to the treating zone so that continuous circulation thereof occurs.

3,647,527

PROCESS FOR IMPROVING THE RESISTANCE TO SOILING OF POLY(BETA-LACTONE) FIBERS

John C. Moseley, Manaccan, Shaftsbury Road, Woking, Surrey; Rupert E. Schaffer, 3 Robin Lane, Sandhurst, Camberley, Surrey, and Anthony N. Radziwill, Ridgend, Ridgemead Road, Engelfield Green, Egham, Surrey, all of England

Filed Apr. 27, 1970, Ser. No. 32,352

Claims priority, application Great Britain, May 9, 1969, 23,760/69

Int. Cl. B32b *27/02*, *27/36*

U.S. Cl. 117—138.8 A **9 Claims**

A process for improving the resistance to soiling, i.e., reducing the soilability, of polypivalolactone fibers is described which comprises (1) applying to said fibers a polymeric compound comprising polymerized oxyalkylene units and polymerized beta-lactone units and (2) heating the treated fibers to a temperature of at least 140° C.

3,647,528

POLYVINYL ALCOHOL COATING COLORS

David O. Barlow, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 7, 1970, Ser. No. 1,157

Int. Cl. D21h *1/32*; C08f *29/26*

U.S. Cl. 117—155 UA **7 Claims**

Polyvinyl alcohol having a 4 percent solution viscosity at 20° C. in the range of 7.5 to 16 centipoises is uniquely

adapted to function as the sole pigment binder in paper coating colors and to improve the rheological properties thereof.

3,647,529

REINFORCED STRUCTURAL PLASTICS

Hyman R. Lubowitz, Redondo Beach; William P. Kendrick, Manhattan Beach; John F. Jones, Torrance; Richard S. Thorpe, Costa Mesa, and Eugene A. Burns, Palos Verdes Estates, all of Calif., assignors to TRW Inc.,, Redondo Beach, Calif.

Filed July 10, 1967, Ser. No. 651,972
Int. Cl. C03c *25/00*
U.S. Cl. 117—161 UN **6 Claims**

0000

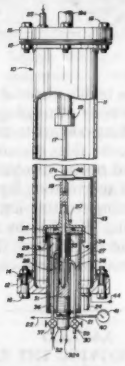
This invention relates to reinforced polyimide structures. Reinforcing materials are impregnated with a suspension of polyimide prepolymer and bonded together by heat and pressure to form a cured, hard-reinforced, polyimide structure.

3,647,530

PRODUCTION OF SEMICONDUCTOR MATERIAL

Lawrence D. Dyer, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 13, 1969, Ser. No. 876,243
Int. Cl. H01l *3/12*
U.S. Cl. 117—201 **17 Claims**



When producing semiconductor bodies by a process of depositing semiconductor material from a gaseous mixture on an elongated crystalline semiconductor starting filament held between two laterally fixed supports, lateral stresses in the filaments are removed by allowing substantially friction-free, lateral movement of the filament as it is heated prior to the vapor deposition. This movement is allowed by melting a coupling segment between the filament and at least one of the supports to thereby allow lateral deformation of the coupling segment as any lateral stress of the filament is relieved. When this method is coupled with conventional means of relieving longitudinal stress in the filament, perfection in grown semiconductor bodies is maintained.

3,647,531

METHOD OF APPLYING COATING OF METAL OXIDES UPON SUBSTRATES

Toru Matsushita, Yokohama-shi; Kunimoto Suzuki, Tokyo, and Shoji Hasegawa, Yokohama-shi, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan

Filed Apr. 8, 1968, Ser. No. 719,702
Claims priority, application Japan, Apr. 11, 1967, 42/22597; Oct. *13*, 1967, 42/65390
Int. Cl. C03c *17/22*
U.S. Cl. 117—211 **4 Claims**

A composition consisting of an organic stannous compound wherein organic radicals and divalent tin are bonded together by the aid of oxygen such as a stannous alkoxide $Sn(OR)_2$ or stannous acyl compound $Sn(OOCR)_2$ and an organic material compound wherein organic radicals and titanium or antimony atom are bonded together by the aid of oxygen such as antimonous alkoxide $Sb(OR)_3$, antimonous acyl compound $Sb(OOCR)_3$, titanium (IV) alkoxide $Ti(OR)_4$ or titanium (IV) acyl compound $Ti(OOCR)_4$ is applied upon the surface of a substrate and the applied composition is pyrolyzed to form a coating of electroconductive metal oxide on the substrate.

3,647,532

APPLICATION OF CONDUCTIVE INKS

Arnold I. Friedman, South Euclid, and Ralph L. Bartholomew, Painesville, both of Ohio, assignors to General Electric Company

Filed Feb. 17, 1969, Ser. No. 799,979
Int. Cl. H01b *1/02*
U.S. Cl. 117—212 **7 Claims**

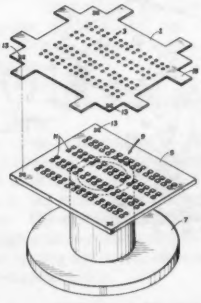
Conducting inks comprising metalic powders such as copper suspended with glass frits in fugitive or temporary organic binders, preferably with reducing compounds, can be used to make printed conductors by firing a refractory substrate coated with the ink in an atmosphere which is essentially neutral except that it contains sufficient oxygen to burn out the temporary binder, but with the oxygen at a low enough partial pressure that it will not cause any substantial oxidation of the metal particles.

3,647,533

SUBSTRATE BONDING BUMPS FOR LARGE SCALE ARRAYS

Robert E. Hicks, Baltimore, Md., assignor to The United States of America as represented by the Secretary of the Navy

Filed Aug 196[illegible], Ser. No. 848,448
[illegible] 52
U.S. Cl. 117—212 **4 Claims**



A method for producing reliable bonding bumps on large-scale array substrates and hybrid add-on components, the present invention is compatible with a wide variety of microcircuit components. Generally, the method envisions fabrication of bonding bumps by thin-film vacuum deposition through a mechanical mask. In particular, a first metal is deposited on a substrate to a desired thickness whereupon said first metal is then codeposited with a second metal. The bump is completed with the sole deposition of the second metal. A bump thus produced may be further processed to produce a "solder-dipped bump" or may be used in the thin-film state for component mounting.

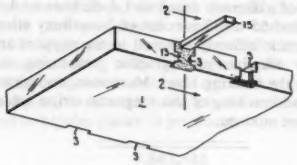
3,647,534
PREPARATION OF WELDING SURFACES ON SEMICONDUCTORS

Stanley B. Rice, Jr., Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Original application Oct. 29, 1965, Ser. No. 505,687, now Patent No. 3,494,790, dated Feb. 10, 1970. Divided and this application Apr. 16, 1969, Ser. No. 851,507

Int. Cl. B44d *1/18*

U.S. Cl. 117—212 **2 Claims**



A method of forming a weldable surface on a ceramic member by: 1. dispersing particles of cuprous oxide which will react with the ceramic onto the ceramic surface; 2. heating the particles under time and temperature conditions which cause the particles to react with the ceramic; and 3. immersing the ceramic in a nickel solution for depositing a layer of nickel on the reacted area.

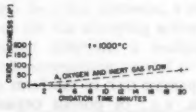
3,647,535
METHOD OF CONTROLLABLY OXIDIZING A SILICON WAFER

Charles T. Naber, Centerville, Ohio, assignor to The National Cash Register Company, Dayton, Ohio

Filed Oct. 27, 1969, Ser. No. 869,699

Int. Cl. H01 *7/60*

U.S. Cl. 117—212 **7 Claims**



The present invention relates to a method of growing an optimum-thickness silicon dioxide layer for a nonvolatile metal-silicon nitride-silicon oxide-silicon field effect memory transistor near atmospheric pressure in a controllable manner. A silicon wafer, having source and drain regions therein, is placed within an epitaxial reactor through which an inert gas is then made to flow at a rate of 30 liters/minute. The silicon wafer is heated to 1,000° centigrade, and a 1.2-liter flow of oxygen is introduced into said epitaxial reactor for 15 minutes. The flow of oxygen gas is dispersed throughout the flow of the inert gas. The silicon crystal is slowly oxidized to form a 52.5-angstrom thick silicon dioxide layer thereon. When the selected time of oxidation has passed, the small flow of the oxygen into the epitaxial reactor is stopped. The total oxygen-inert flowing gas pressure in the epitaxial reactor is slightly above atmospheric pressure. A precise regulation of the thickness of a silicon dioxide layer grown on a silicon crystal is achieved by regulating the flow rate of oxygen relative to the flow rate of inert gas and regulating the oxidation temperature. The method of the present invention allows one to produce a 52.5-angstrom thick silicon dioxide layer on a silicon crystal. The 52.5-angstrom thick silicon dioxide layer is then covered with a 1,000-angstrom thick silicon nitride layer by chemical decomposition in the epitaxial reactor. A metal electrode in the silicon nitride layer and metal electrodes on the uncovered source and drain regions complete an MNOS field effect memory transistor which has very good switching characteristics.

3,647,536
OHMIC CONTACTS FOR GALLIUM ARSENIDE

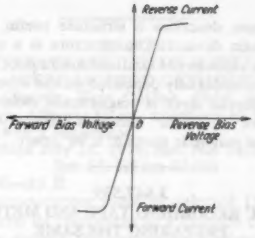
George King; John William Frederick Rayner, both of Harlow, and Anthony Charles Powell, Dunmow, all of England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed June 5, 1970, Ser. No. 43,871

Claims priority, application Great Britain, Aug. 1, 1969, 38,730/69

Int. Cl. C23b *5/50*; **C23c** *1/04*, *13/04*

U.S. Cl. 117—227 **7 Claims**



Improved contact resistance to a gallium arsenide body is obtained by alloying the contact metal into the GaAs body in an arsenic vapor atmosphere.

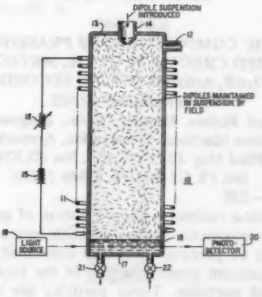
3,647,537
METHOD FOR MAKING ELECTRO-OPTIC DIPOLES

Charles M. Pleass, Reiffton, Pa., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 21, 1969, Ser. No. 792,521

Int. Cl. C23c *3/02*

U.S. Cl. 117—227 **2 Claims**



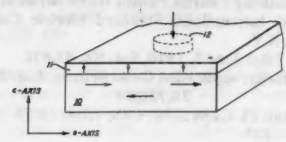
Electro-optic dipoles are produced by metal coating of presized substrates to the desired resistivity. Substrate materials and processes are described. Coating of substrates is provided with nickel or other metals to finely controlled thicknesses. Uses described include dye pigment and electro-optic shutter.

3,647,538

MAGNETIC ELEMENT USING ISOLATED DOMAINS IN RARE EARTH ORTHOFERRITES

Raymond Wolfe, New Providence, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 5, 1968, Ser. No. 703,162
Int. Cl. H01f 10/02, 10/04
U.S. Cl. 117—234 9 Claims



The disclosure describes a structure useful for isolated magnetic domain devices. The structure is a composite of samarium-rich orthoferrite and samarium-poor orthoferrite one of which is epitaxially deposited on the other. The result is that the epitaxial layer is magnetically isolated from the substrate since in these materials the crystallographic direction of net magnetic moment is 90° apart.

3,647,539

MAGNETIC RECORDING TAPE AND METHOD FOR PREPARING THE SAME

Sheldon Alan Weber, San Mateo, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Feb. 9, 1970, Ser. No. 10,019
Int. Cl. H01f 10/02
U.S. Cl. 117—235 6 Claims

Dispersion of magnetic pigments such as gamma ferric oxide, along with a small amount of finely divided carbon, in a resin binder composition applied as a coating to a backing material for use in magnetic recording media is facilitated by use of a triloweralkyl polypropyleneoxy quaternary ammonium dispersant compound. Said dispersant compounds offer the advantages of improved pigment dispersion in less mixing time than has heretofore been possible and of improved electrical conductance in the final recording product. At the same time, the final product is one having improved adhesion between the coating and the substrate.

3,647,540

MAGNETIC COMPOSITIONS OF PRASEODYMIUM MODIFIED CHROMIUM OXIDE, METHODS OF MANUFACTURE, AND MAGNETIC RECORDING MEDIA CONTAINING SAME

Robert Samuel Haines, Boulder, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 25, 1970, Ser. No. 40,378
Int. Cl. G11b 5/70; C04b 35/00
U.S. Cl. 117—235 7 Claims

This invention relates to the formation of praseodymium modified ferromagnetic chromium oxide compositions containing 56 to 61 percent chromium combined with oxygen and 1 to 6 percent praseodymium, in the form of uniform finely divided particles. These particles are of tetragonal crystalline structure and have a length-to-width ratio of as much as 20 to 1 and an actual length in the range of about 1 to 7 microns and are utilized in the preparation of magnetic recording media. The process of forming praseodymium modified chromium oxide ferromagnetic compositions consists of mixing a chromium compound with a source of praseodymium, and then subjecting the mixture to heat and pressure.

3,647,541

PROCESS FOR APPLYING A MAGNETIC TRACK DIRECTLY ON AN ANTIHALATION BACKING OF A CINEMATOGRAPHIC FILM

Rene Prevot, Vincennes, France, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 28, 1970, Ser. No. 41,582
Int. Cl. H01f 10/06
U.S. Cl. 117—239 3 Claims

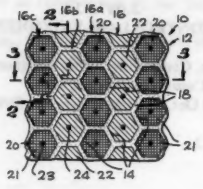
A magnetic sound track is applied on the antihalation backing layer of a cinematographic film, such as cellulose acetate, by coating the magnetic particles from a solution containing a polymeric binder (such as nitrocellulose) dissolved in a solvent mixture consisting essentially of about 15 to 35 percent of a dioxane (such as 1,4-dioxane or 4-methyl-1,3-dioxane) and 65 to 85 percent of 2-methoxy ethanol, by weight. This track is firmly adhered to the support and is irremovable by alkaline photographic processing solutions which remove the backing layer. Moreover, undesirable curl of the film, and cracking of the magnetic stripe are avoided with this solvent mixture.

3,647,542

SOLID-FLUID BATTERY

Carl Berger, Santa Ana, Calif., assignor to McDonnell Douglass Corporation, Santa Monica, Calif.

Filed Dec. 19, 1966, Ser. No. 603,019
Int. Cl. H01m 35/04, 3/02, 3/04
U.S. Cl. 136—6 14 Claims



An electrode-separator unit in the form of a nonmetallic honeycomb matrix, e.g., of porous organic or inorganic material, and having first catalyst electrode material, e.g., platinum, and second active battery electrode material, e.g., zinc, separately contained in cells of the honeycomb matrix. A fluid operable battery incorporating the above honeycomb electrode-separator unit.

3,647,543

LOW-MAINTENANCE BATTERIES HAVING ELECTROLYTE RESERVOIR IN VAPOR CONTACT WITH THE CELLS

Royce E. Biddick, Edina, Minn., assignor to Gould Inc., St. Paul, Minn.

Filed Nov. 14, 1969, Ser. No. 876,724
Int. Cl. H01m 11/00
U.S. Cl. 136—6 7 Claims

A low-maintenance lead acid pile battery is disclosed in which a reservoir of water or electrolyte is positioned in vapor contact with the cells. A porous nonconductive member separates the reservoir from the cells but permits vapor diffusion therethrough to replenish water lost due to evaporation and electrolysis. The porous member also permits oxygen transfer from the positive plates to the negative plates of the battery.

3,647,544

BATTERY PLATE HAVING DUAL POROSITY

Friedrich August Schneider, Nuenen, Netherlands, assignor to The International Nickel Company, Inc., New York, N.Y.

Continuation-in-part of application Ser. No. 707,312, Feb. 21, 1968, now abandoned, Continuation-in-part of application Ser. No. 809,423, Mar. 21, 1969, now abandoned. This application Nov. 24, 1969, Ser. No. 879,600

Claims priority, application Great Britain, Apr. 5, 1968, 16,585/68

Int. Cl. H01m *43/04*

U.S. Cl. 136—24 8 Claims

Directed to the production of battery plates having dual porosity and having a plurality of expanded metal grids electrically connected in parallel with the grids having a porous galvanically active material such as cadmium adhering thereto, the larger pores formed by pockets in the expanded metal communicating with finer pores in the porous metal surrounding the pockets and with a greater proportion of the galvanically active material being placed in the interior of the plate, and to bipolar plates so produced.

3,647,545

BATTERY ELECTRODE GRIDS MADE FROM TIN-LITHIUM-LEAD ALLOY

George W. Mao, St. Paul, Minn., assignor to Gould-National Batteries, Inc., St. Paul, Minn.

Filed June 2, 1969, Ser. No. 829,745

Int. Cl. C22c *11/02*; H01m *35/02*

U.S. Cl. 136—26 6 Claims

A grid supporting structure made of an alloy consisting of 0.05–0.5 percent tin, 0.02–0.03 percent lithium and balance lead which gives improved service in lead acid battery cells is described.

3,647,546

TUBULAR-TYPE POSITIVE PLATES

Wesley Townsend Cording, Plymouth Meeting, Pa., assignor to ESB Incorporated

Filed May 21, 1970, Ser. No. 39,433

Int. Cl. H01m *35/04*

U.S. Cl. 136—43 11 Claims

A tubular-type positive plate for use in lead acid storage batteries is described having tight fitting individual sleeve of a shrinkable material surrounding and closing the end of the tube and the spine. In a first alternate, a plug within the tube provides a backup for the clamping action of the shrinkable sleeve. In a second alternate, a multiopening shrinkable sleeve is provided surrounding several or all the tubes of a single plate.

3,647,547

PROCESS FOR REMOVAL OF NITRATES FROM SINTERED NICKEL PLAQUES IMPREGNATED WITH NICKEL SALTS

Torbjorn Nervik, Selbu, Norway, assignor to ESB Incorporated

Filed Aug. 26, 1970, Ser. No. 67,265

Int. Cl. H01m *35/18*

U.S. Cl. 136—75 4 Claims

A process is described for the removal of residual nitrates from battery plaques impregnated with nickel hydroxide by a treatment in basic potassium persulfate.

3,647,548

METHOD AND APPARATUS FOR ELECTRODE CONVERSION

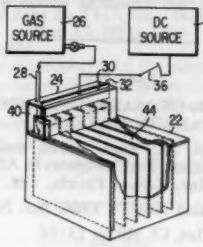
John Lennart Andersson, Ytterby, and Ove Karl-Gustav Nilsson, Nol, both of Sweden, assignors to Aktiebolaget Tudor, Stockholm, Sweden

Filed Mar. 5, 1970, Ser. No. 16,738

Int. Cl. H01m *35/18*

U.S. Cl. 136—82 9 Claims

Method and apparatus for passing a current of gas over the electrical contact between a conductor of direct current and the material to be electrochemically converted into an electrode for a lead-acid storage battery, the electrical contact



being out of contact with the electrolyte.

3,647,549

SOLID STATE CELL WITH A TELLURIUM TETRAIODIDE CATHODE

Joseph H. Christie, Fort Collins, Colo., and James R. Humphrey, Albany, Oreg., assignors to North American Rockwell Corporation

Filed July 21, 1970, Ser. No. 56,790

Int. Cl. H01m *21/00*

U.S. Cl. 136—83 R 15 Claims

An electron-acceptor material selected from tellurium tetraiodide and its complexes as a cathode component for a solid state electric cell containing a silver anode and a silver-ion-conducting solid electrolyte. The tellurium tetraiodide compositions utilized as electron-acceptor cathode component consist of tellurium tetraiodide alone or as a complex of tellurium tetraiodide preferably with selected alkali metal iodides or organic ammonium iodides.

3,647,550

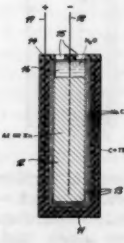
DISPOSABLE ELECTROCHEMICAL CELLS AND METHOD OF OPERATING SAME

Frederick P. Kober, Bayside, and Hiry B. West, New York, N.Y., assignors to Yardney International Corp., New York, N.Y.

Continuation-in-part of application Ser. No. 854,736, Sept. 2, 1969. This application Jan. 28, 1970, Ser. No. 6,461

Int. Cl. H01m *29/02*, *29/04*

U.S. Cl. 136—86 A 3 Claims



An electrochemical cell with an air-depolarizable cathode, a consumable anode of a base metal (e.g. zinc or aluminum) and an interelectrode separator laden with the anhydride of an aqueous electrolyte, such as sodium chloride, is activated by the introduction of a volume of water sufficient for only a fractional discharge of the

stored electric energy. Upon prolonged idleness after activation, the depletion of the residual water supply by chemical action and evaporation halts the interaction between the stored electrolyte and the anode material, thereby conserving the remaining energy and inhibiting corrosion.

3,647,551

METHOD OF MAKING A POROUS CARBON MATERIAL

Madison W. Reed, Jr., Forf Worth, and Warren C. Schwemer, Arlington, Tex., assignors to Advanced Technology Center, Inc., Grand Prairie, Tex.

No Drawing. Filed Nov. 7, 1966, Ser. No. 592,306

Int. Cl. H01m *13/04*

U.S. Cl. 136—122 **26 Claims**

A method of making a monolithic carbon material having a metallic activator or the like uniformly distributed throughout the finished material, including the steps of preparing a dry mixture of polyvinylidene chloride and the desired metallic activator (or a precursor therefor), and then pyrolyzing the mixture. The carbon material may be used as a battery electrode, fuel cell electrode, etc., and the metallic activator is selected from the group including tungsten, silver, gold, copper, tantalum, nickel, etc. An optional step in the process involves grinding a mixture of particles of polyvinylidene chloride and a desired metal with pieces of solid carbon dioxide so that the polyvinylidene chloride will be reduced in size and not just deformed during grinding.

3,647,552

DRY CELLS

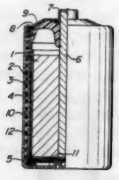
Jun Watanabe, Osaka, Susumu Hosoi, Neyagawa-shi, Masahiro Kuwazaki and Akira Ota, Osaka, and Toshikatsu Takata and Junichi Asaoka, Moriguchi-shi, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed July 22, 1969, Ser. No. 843,598

Claims priority, application Japan, July 24, 1968, 43/52,889; July 31, 1968, 43/54,749

Int. Cl. H01m *3/02*

U.S. Cl. 136—131 **3 Claims**



A dry cell of excellence in performances, particularly in discharge characteristics, in which a membrane is interposed between a cathode mixture and a negative electrode constituting zinc casing, and more specifically between the cathode mixture and a paste layer, said membrane being of such a character that it blocks the transfer of water and a paste from the paste layer side to the cathode mixture side without being dissolved during storage and in the earlier stages of discharge of the cell, whereas it is dissolved to prevent a sharp increase of the zinc ion concentration in the vicinity of the paste layer in the latter stage of discharge of the cell when the zinc ion concentration in the electrolyte is increased.

3,647,553

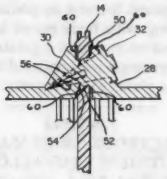
INTERCELL CONNECTION FOR STORAGE BATTERIES

James P. Coffey, Hatboro, Pa., assignor to ESB Incorporated

Filed June 22, 1970, Ser. No. 47,988

Int. Cl. H01m *5/00*

U.S. Cl. 136—134 R **9 Claims**



The internal connection between cell elements of a multi-cell storage battery is effected by forcing and rotating a metallic connector member through a metallic extension of a first cell element, through the intercell partition and into a metallic extension of the second cell element. In so doing, the metal of the insert is thermally fused to the metal of the two metallic extensions.

3,647,554

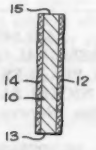
BATTERY SEPARATOR AND METHOD OF PRODUCING SAME

Frank C. Arrance, Costa Mesa, and Albert G. Rosa, Placentia, Calif., assignors to McDonnell Douglas Corporation, Santa Monica, Calif.

Filed Apr. 17, 1969, Ser. No. 817,085

Int. Cl. H01m *3/02*

U.S. Cl. 136—145 **21 Claims**



Production of an improved separator having extended life, particularly over a large number of deep discharge cycles when employed in a high energy density battery, such as a silver-zinc battery, by overcoating a rigid inorganic separator, with a thin layer of a flexible substantially inorganic separator film, the inorganic material of the rigid separator and of the flexible overcoating being the same, or different, inorganic materials. Thus the inorganic separator material for the rigid separator and flexible overcoating can be a solid solution of magnesium silicate and iron silicate; or the inorganic material of the rigid separator can be the latter inorganic material and the inorganic material of the flexible separator can be zirconia.

3,647,555

WATER ACTIVATED DRY CHARGED STORAGE BATTERY HAVING BUOYANT INTERNAL TEAR STRIP PLASTIC BAG CONTAINING ELECTROLYTE PRODUCING SUBSTANCE

Fred P. Daniel, North Olmstead, Ohio, assignor to ESB Incorporated

Filed Oct. 3, 1969, Ser. No. 863,579
Int. Cl. H01m *11/00*
U.S. Cl. 136—162 6 Claims

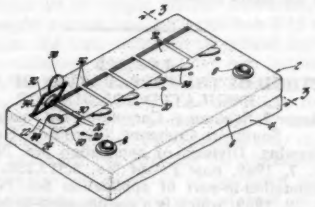
A dry charged storage battery has an internal plastic bag inside of which is a suubstance which in the presence of water will produce the battery's electrolyte. A tear strip connected to the bag becomes accessible from outside the battery through an opening in the battery's cover after water has been added due to the buoyancy of the bag and/or a float attached to the tear strip.

3,647,556

STORAGE BATTERY COVER

John M. Cox, Pendleton, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed June 26, 1970, Ser. No. 50,222
Int. Cl. H01m *1/02*
U.S. Cl. 136—170 2 Claims



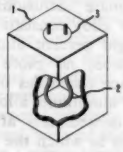
A one-piece storage battery cover having electrolyte filler openings covered and sealed by integrally formed life-hinged lids having integrally formed plugs which engage the openings in an interference fit. In the closed position, the lids are substantially flush with the top of the battery cover. Tabs for lifting the lids are provided.

3,647,557

HOLLOW, GAS PERMEABLE FIBER VENTED SEALED GALVANIC CELLS

Matthew Roland Kegelman, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 19, 1970, Ser. No. 65,200
Int. Cl. H01m *1/06*
U.S. Cl. 136—177 8 Claims



Sealed galvanic cells having high structural strength and minimum volume can be produced that have sufficient gas venting systems by disposing at least one liquid impervious, gas pervious hollow fiber in the galvanic cell such that the interior of the hollow fiber communicates only with the external atmosphere surrounding the cell.

3,647,558

PROTECTED THERMOCOUPLE AND PROTECTION TUBE

Carl H. McMurtry, Lewiston, N.Y., assignor to The Carborundum Company, Niagara Falls, N.Y.

Filed June 26, 1967, Ser. No. 648,821
Int. Cl. H01r *1/04*
U.S. Cl. 136—234 11 Claims

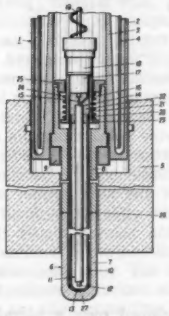
A composite protection tube for protecting a temperature measuring means in a molten metal bath comprising an inner refractory tube, a consumable outer metallic casing, and an intermediate layer of a carbon impregnated refractory grain to minimize thermal shock and resist the corrosive attack of molten metals and their associated slag.

3,647,559

MEASURING DEVICE FOR CONTINUOUSLY MEASURING THE TEMPERATURE OF METAL BATHS

Meinhard Truppe, Matthias Schernthaner, and Günter Poferl, Linz, Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke Aktiengesellschaft, Linz, Austria

Filed Oct. 12, 1970, Ser. No. 79,825
Claims priority, application Austria, Oct. 16, 1969, 9,728
Int. Cl. G01k *1/12*; H01v *1/02*
U.S. Cl. 136—234 7 Claims



The invention relates to a measuring device for continuously measuring the temperature of metal baths comprising a thermocouple with a hot junction, a capillary tube enclosing said thermocouple, and a sheath tube enclosing said capillary tube, said thermocouple having its leads connected to a socket of a coaxial plug providing for a connection to the compensating line of said thermocouple, said capillary tube and said socket being joined by a sleeve of electrically insulating material to form an integrally connected unit, wherein the improvement resides in that the device further comprises a gas-tight tube surrounding said capillary tube and extending with its upper end into said sleeve and being connected therewith so that the gas-tight tube is included into the integrally connected, exchangeable unit, the lower end of the gas-tight tube being closed and the hot junction of said thermocouple being arranged at a distance from the bottom of the gas-tight tube. By this invention an excellent heat transfer between the sheath tube and the gas-tight tube is obtained as well as an excellent temperature indication of the thermocouple although its tip does not immediately contact the bottom of the gas-tight tube. The danger that the thermocouple might break

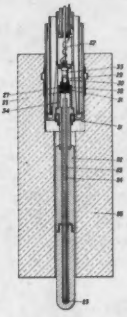
owing to shocks or the occurrence of thermal stresses and the penetration of humidity to the thermocouple leads is avoided.

3,647,560
MEASURING LANCE FOR CONTINUOUSLY MEASURING THE TEMPERATURE OF METAL BATHS

Meinhard Truppe, Matthias Schernthaner, and Günter Poferl, Linz, Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke Aktiengesellschaft, Linz, Austria

Filed May 12, 1969, Ser. No. 823,858
Claims priority, application Austria, May 15, 1968, 4,656/68, 4,658/68
Int. Cl. G01k *1/12*; H01v *1/02*
U.S. Cl. 136—234 **3 Claims**

A measuring lance used for continuously measuring the temperature of metal baths during refining by top-blowing oxygen with the aid of a blowing lance is described. The measuring lance is introduced with its sensing portion into a hot metal bath and is adjusted to a predetermined distance from the axis of said blowing lance, clear of the refractory, and to a predetermined depth below the initial metal bath surface for the duration of the measuring process. In the intervals between measurements continued over a plurality of heats, the sensing portion of the measuring lance is kept hot by introducing it into a warming chamber arranged outside the converter. The measuring lance comprises a sheath tube supporting a thermocouple-containing capillary tube, connection of the thermocouple branches to their compensating line being accomplished by connecting them to a coaxial plug socket joined to be integral with said capillary tube by a sleeve of insulating material.

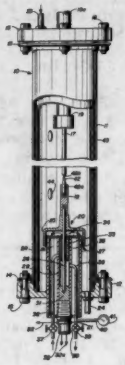


3,647,561
PRODUCTION OF SINGLE CRYSTAL SEMICONDUCTOR MATERIAL

Lawrence D. Dyer, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 31, 1969, Ser. No. 889,573
Int. Cl. B01j *17/00*
U.S. Cl. 148—1.6 **6 Claims**

The perfection of single crystal semiconductor material is maintained within a body grown by the vapor phase deposition of the semiconductor material on a heated single crystal seed filament by allowing substantially friction-free lateral and longitudinal movement of the filament as it is heated prior to the vapor deposition, allowing substantially friction-free longitudinal movement of the body as it contracts while cooling after the deposition process, and maintaining the difference in temperature throughout the cross section of the filament and the growing body at a value to prevent substantial densities of dislocations from forming in the crystal structure during the entire process.



3,647,562
METHOD OF THE PREPARATION OF A SOLID INSULATED CONDUCTOR

Roger J. Schoerner, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.

No Drawing. Division of application Ser. No. 814,182, Apr. 7, 1969, now Patent No. 3,513,250, which is a continuation-in-part of application Ser. No. 795,055, Jan. 29, 1969, which is a continuation-in-part of application Ser. No. 779,376, Nov. 27, 1968, which in turn is a continuation-in-part of application Ser. No. 730,933, May 21, 1968. This application Apr. 1, 1970, Ser. No. 31,460
Int. Cl. C22f *1/04*
U.S. Cl. 148—2 **9 Claims**

A solid insulated conductor prepared from an aluminum alloy wire having an electrical conductivity of at least sixty-one percent based on the International Annealed Copper Standard and unexpected properties of increased ultimate elongation, bendability and fatigue resistance when compared to conventional EC wire of the same tensile strength. The aluminum alloy wire contains substantially evenly distributed iron aluminate inclusions in a concentration produced by the addition of more than about 0.30 weight percent iron and no more than 0.15 weight percent silicon to an alloy mass containing less than about 99.70 weight percent aluminum and trace quantities of conventional impurities normally found within a commercial aluminum alloy. The substantially evenly distributed iron aluminate inclusions are obtained by continuously casting an alloy consisting essentially of less than about 99.70 weight percent aluminum, more than 0.30 weight percent iron, no more than 0.15 weight percent silicon and trace quantities of typical impurities to form a continuous aluminum alloy bar, hot-working the bar substantially immediately after casting in substantially that condition in which the bar is cast to form continuous rod which is subsequently drawn into wire without intermediate anneals, annealed after the final draw and insulated. After annealing, the wire has the aforementioned novel and unexpected properties of increased ultimate elongation, electrical conductivity of at least sixty-one percent of the International Annealed Copper Standard and increased bendability and fatigue resistance.

3,647,563
METHOD OF THE PREPARATION OF A MULTI-FILAMENT CONDUCTOR
Roger J. Schoerner, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.
No Drawing. Division of application Ser. No. 814,198, Apr. 7, 1969, now Patent No. 3,513,251, which is a continuation-in-part of application Ser. No. 779,376, Nov. 27, 1968, which in turn is a continuation-in-part of application Ser. No. 730,933, May 21, 1968. This application Apr. 1, 1970, Ser. No. 31,462
Int. Cl. C22f *1/04*
U.S. Cl. 148—2 10 Claims

An insulated multi-filament conductor prepared from aluminum alloy having an electrical conductivity of at least sixty-one percent (61%) based on the International Annealed Copper Standard and unexpected properties of increased ultimate elongation, bendability and fatigue resistance when compared to conventional EC wire of the same tensile strength. The aluminum alloy wires contain substantially evenly distributed iron aluminate inclusions in a concentration produced by the addition of more than about 0.30 weight percent iron to an alloy mass containing less than about 99.70 weight percent aluminum, no more than 0.15 weight percent silicon, and trace quantities of conventional impurities normally found within a commercial aluminum alloy. The substantially evenly distributed iron aluminate inclusions are obtained by continuously casting an alloy consisting essentially of less than about 99.70 weight percent aluminum, more than 0.30 weight percent iron, no more than 0.15 weight percent silicon and trace quantities of typical impurities to form a continuous aluminum alloy bar, hot-working the bar substantially immediately after casting in substantially that condition in which the bar is cast to form continuous rod which is subsequently drawn into wire without intermediate anneals and annealed after the final draw. After annealing, the wire has the aforementioned novel and unexpected properties of increased ultimate elongation, electrical conductivity of at least sixty-one percent (61%) of the International Annealed Copper Standard, and increased bendability and fatigue resistance.

3,647,564
METHOD OF THE PREPARATION OF AN INSULATED TELEPHONE CABLE
Roger J. Schoerner, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.
No Drawing. Division of application Ser. No. 814,200, Apr. 7, 1969, now Patent No. 3,515,796, which is a continuation-in-part of application Ser. No. 779,376, Nov. 27, 1968, which in turn is a continuation-in-part of application Ser. No. 730,933, May 21, 1968. This application Apr. 1, 1970, Ser. No. 31,463
Int. Cl. C22f *1/04*
U.S. Cl. 148—2 11 Claims

An insulated telephone cable is prepared from individually insulated conductors which are gathered together and insulated as a unit. The individually insulated conductors are prepared from aluminum alloy wires having an acceptable electrical conductivity of at least sixty-one percent based on the International Annealed Copper Standard and an increased tensile strength when compared to conventional aluminum alloy wire of the same percent ultimate elongation. In addition, the present wire has an increased percent ultimate elongation when compared to conventional wire of the same tensile strength. The aluminum alloy wires contain substantially evenly distributed iron aluminate inclusions in a concentration produced by the addition of more than about 0.30 weight percent iron and no more than 0.15 weight percent silicon to an alloy mass containing less than about 99.70 weight percent aluminum and trace quantities of conventional impurities normally found within a commercial aluminum alloy. The substantially evenly distributed iron aluminate inclusions are obtained by continuously casting an alloy consisting essentially of less than about 99.70 weight percent aluminum, more than 0.30 weight percent iron, no more than 0.15 weight percent silicon and trace quantities of typical impurities to form a continuous aluminum alloy bar, hot-working the bar substantially immediately after casting in substantially that condition in which the bar is cast to form continuous rod which is subsequently drawn into wire without intermediate anneals, annealed after the final draw and insulated. After annealing and insulating, the individual wires are brought together and insulated with an outer sheath. The telephone cable generally consists of two or more individually insulated wires brought together in a conventional stranding operation.

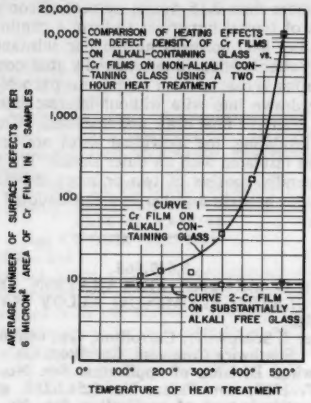
3,647,565
METHOD OF THE PREPARATION OF AN INSULATED ALUMINUM ALLOY MAGNET WIRE
Roger J. Schroerner, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.
No Drawing. Division of application Ser. No. 814,201, Apr. 7, 1969, now Patent No. 3,513,252, which is a continuation-in-part of application Ser. No. 795,038, Jan. 29, 1969, which is a continuation-in-part of application Ser. No. 779,376, Nov. 27, 1968, which in turn is a continuation-in-part of application Ser. No. 730,933, May 12, 1968. This application Apr. 1, 1970, Ser. No. 31,464
Int. Cl. C22f *1/04*
U.S. Cl. 148—2 10 Claims

An insulated solid magnet wire, prepared from an aluminum alloy wire having an acceptable electrical conductivity of at least sixty-one percent (61%) based on the International Annealed Copper Standard and a minimum of fifteen percent (15%) ultimate elongation, has improved physical properties of increased tensile strength and fatigue resistance when compared to conventional magnet wire. The aluminum alloy wire contains substantially evenly distributed iron aluminate inclusions in a concentration produced by the addition of more than about 0.30 weight percent iron and no more than 0.15 weight percent silicon to an alloy mass containing less than about 99.70 weight percent aluminum and trace quantities of conventional impurities normally found within a commercial aluminum alloy. The substantially evenly distributed iron aluminate inclusions are obtained by continuously casting an alloy consisting essentially of less than about 99.70 weight percent aluminum, more than 0.30 weight percent iron, no more than 0.15 weight percent silicon and trace quantities of typical impurities to form a continuous aluminum alloy bar, hot-working the bar substantially immediately after casting in substantially that condition in which the bar is cast to form continuous rod which is subsequently drawn into wire without intermediate anneals and annealed after the final draw. After annealing, the wire has the aforementioned novel and unexpected properties of a minimum of fifteen percent (15%) ultimate elongation, electrical conductivity of at least sixty-one percent (61%) of the International Annealed Copper Standard and increased tensile strength, bendability and fatigue resistance.

3,647,566
CHROMIUM FILMED GLASS ARTICLES AND METHOD FOR MAKING THE SAME
Raymond E. Szupillo, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.
Filed Nov. 14, 1968, Ser. No. 775,860
Int. Cl. C23c *11/04, 11/00*
U.S. Cl. 148—6.3 17 Claims

Improved chromium film glass based articles having a low incidence of film surface defects, and highly hardened extremely scratch and wear resistant quality. The

method includes the use of a substantially alkali-free glass substrate upon which is formed a chromium film,


COMPARISON OF HEATING EFFECTS ON DEFECT DENSITY OF Cr FILMS ON ALKALI-CONTAINING GLASS vs. Cr FILMS ON NON-ALKALI CONTAINING GLASS USING A TWO HOUR HEAT TREATMENT
CURVE 1 Cr FILM ON ALKALI CONTAINING GLASS
CURVE 2-Cr FILM ON SUBSTANTIALLY ALKALI FREE GLASS
AVERAGE NUMBER OF SURFACE DEFECTS PER 6 MICRON² AREA OF Cr FILM IN 5 SAMPLES
20,000
10,000
1,000
100
10
1
0° 100° 200° 300° 400° 500°
TEMPERATURE OF HEAT TREATMENT

after which the composite so formed is heat treated to obtain the desired film hardness and electromagnetic energy reflective quality.

3,647,567

POST-DIPPING OF ACIDIC DEPOSITION COATINGS

Raphael Joseph Schweri, Louisville, Ky., assignor to Celanese Coatings Company, New York, N.Y.

No Drawing. Filed Nov. 28, 1969, Ser. No. 880,981
Int. Cl. B44d *1/44*
U.S. Cl. 148—6.15 R **10 Claims**

Metallic articles are coated with an adherent polymer film by the acidic deposition process which comprises contacting these metallic articles with an aqueous bath containing a synthetic resinous film forming emulsion and an oxidizing acid system. By subjecting these acidic deposition coatings to a solution, about 0.25 to 7.0 weight percent of which contains a material selected from phosphoric acid, chromium trioxide and water or acid soluble chromates and dichromates, the resistance properties—especially water and salt spray resistance—of these coatings are enhanced.

3,647,568

COLORED PHOSPHATE COATINGS AND METHOD OF APPLICATION

Gary B. Larson, Warren, Mich., assignor to MacDermid Incorporated, Waterbury, Conn.

No Drawing. Filed Oct. 28, 1969, Ser. No. 871,952
Int. Cl. C23f *7/10*
U.S. Cl. 148—6.15 Z **7 Claims**

Phosphate compositions containing at least one copper salt are utilized for coating surfaces of ferrous metals. The phosphate coatings achieved, which possess a reddish color, serve as an excellent means of identification of the articles thus coated and, in addition, the finish is of good corrosion resistance.

3,647,569

METAL COATING RINSE COMPOSITION

George Schneider, Lynbrook Hills, Trevose, Pa., assignor to Amchem Products, Inc., Ambler, Pa.

No Drawing. Filed Nov. 27, 1968, Ser. No. 779,616
Int. Cl. C23f *7/26*
U.S. Cl. 148—6.16 **15 Claims**

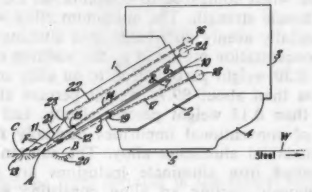
A dilute aqueous rinse composition for rinsing conversion-coated metal surfaces, the composition comprising water, at least about 0.02 g./l. of trivalent chromium, and ferricyanide in an amount at least sufficient to reduce the tendency of chromium from precipitating from the composition, the composition being prepared from an aqueous concentrate containing the trivalent chromium and ferricyanide constituents, the concentrate being aged prior to its being used to prepare the dilute aqueous rinse composition.

3,647,570

OXYGEN TRAP SCARFING METHOD AND APPARATUS

Thomas James Lytle, West Orange, N.J., assignor to Union Carbide Corporation, New York, N.Y.

Filed June 25, 1969, Ser. No. 836,233
Int. Cl. B23k *7/00*
U.S. Cl. 148—9.5 **4 Claims**



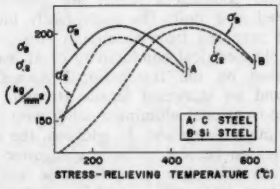
The time required for scarfing the surface of a metal body is decreased by shortening the preheating time. This is accomplished by directing a row of "trap" oxygen streams from ports located above the upper preheat fuel gas ports so that the oxygen streams form a plane which intersects the surface of the metal body in such way as to form a wedge shaped pocket to confine the burning preheating gases. This results in faster puddle formation and causes the puddle to be formed at a location just ahead of the projected converging point of the fuel and oxygen gas streams, rather than in back of the converging point where it would be formed by prior art methods.

3,647,571

PROCESS FOR MANUFACTURING ALLOY STEEL WIRES HAVING LOW RELAXATION CHARACTERISTICS

Kazuo Okamoto, Hikari-shi, Naoki Eguchi, Mitaka-shi, Nasuo Sakao, Hikari-shi, Ichiro Honda, Tokyo, and Eizo Suzuki, Funabashi-shi, Japan, assignors to Nippon Steel Corporation and Suzuki Metal Industry Co., Ltd., Tokyo, Japan

Filed July 14, 1969, Ser. No. 841,343
Claims priority, application Japan, July 18, 1968, 43/50,437
Int. Cl. C21d *9/54, 9/58*
U.S. Cl. 148—12.3 **16 Claims**



A process for manufacturing low-alloy steel wires having low relaxation characteristics at room and elevated temperatures characterized by heating a starting wire material made of low alloy steel containing, as the alloying eyement(s), either silicon alone or a combination of silicon with at least one other element such as chromium, to a temperature above its A_3 transformation point; either

cooling the heated wire material at a specific cooling rate to a temperature just above its Ms point by means of natural or forced air cooling and reheating the cooled wire material, when the material is such that the specific cooling rate can be equal to or higher than the lower critical cooling rate of the material, or cooling the heated wire material by passing it through a bath of molten lead or salt at a temperature of 450–650° C. when the material is such that its air cooling rate is lower than its lower critical cooling rate, in order to obtain a wire material having a highly cold-workable sorbitic structure and high tensile strength; and draw working the thus-obtained wire material and then artificially aging the draw worked wire material to manufacture the desired low-alloy steel wires.

3,647,572
NITRIDING PROCESS

Hoyt H. Todd, La Habra, John F. McIntyre, Downey, and Le Roy Lewis, Los Angeles, Calif., assignors to Ametek, Inc., New York, N.Y.

No Drawing. Filed Aug. 25, 1969, Ser. No. 852,941
Int. Cl. C23c *11/16*
U.S. Cl. 148—16.6 **13 Claims**

A nitriding method for case hardening of chromium ferrous alloys is described which employs a pretreatment of the alloy to deposit nickel or a nickel salt on the alloy surface. The pretreatment permits efficient nitriding of the alloys which, in the absence of such pretreatment, resist nitriding by the presence of an oxide protective surface.

3,647,573
METHOD OF MAKING A BRONZE-IRON COMPOSITE

Edward O. Fuchs, Union, and James H. Swisher, Stirling, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

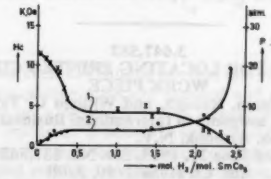
Filed June 5, 1969, Ser. No. 830,721
Int. Cl. B22f *7/00*; H01f *1/08*
U.S. Cl. 148—101 **5 Claims**

A bronze-iron composite containing from 5 to 75 volume percent iron, when produced by; mixing fine powders of bronze and iron oxide, compacting the mixture, reducing the iron oxide to metallic iron, sintering the reduced compact to a billet, followed by cold working the billet to an area reduction in excess of 96 percent, exhibits good permanent magnet properties as well as excellent mechanical strength, and corrosion resistance.

3,647,574
METHOD OF REDUCING THE COERCIVE FORCE OF PERMANENT-MAGNETISABLE MATERIAL

Frans Frederik Westendorp and Hinne Zijlstra, Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 28, 1969, Ser. No. 853,964
Claims priority, application Netherlands, Mar. 14, 1969, 6903931
Int. Cl. H01f *1/04, 1/06*
U.S. Cl. 148—103 **5 Claims**



A method of temporarily reducing the corecive force of a permanent-magnetisable material consisting of the compound M_5R, in which M is cobalt or a combination of Co with at least one of the elements Fe, Ni and Cu and R is at least one of the rare earth elements and Th in which the material is subjected, either during or after exposure to a magnetizing field, to hydrogen gas at pressure up to 30 atmospheres.

3,647,575
METHOD FOR REDUCING LOSSINESS OF SHEET METAL

Alfred Fiedler, Duisburg-Huckingen, and Werner Pepperhoff, Duisburg, Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

No Drawing. Filed Oct. 17, 1969, Ser. No. 867,406
Claims priority, application Germany, Oct. 17, 1968, P 18 04 208.5
Int. Cl. H01f *1/16*
U.S. Cl. 148—111 **9 Claims**

Lossiness of grain-oriented iron alloy sheets is reduced by partial plastic deformation of the surface of the sheet, e.g., by providing narrowly spaced, shallow grooves, preferably at different orientations in opposite sides of the sheet.

3,647,576
METHOD OF HARDENING SINTERED CEMENTED-CARBIDE COMPOSITIONS BY BORONIZING

Katsumi Yamamura and Masami Kasai, Nagano, Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

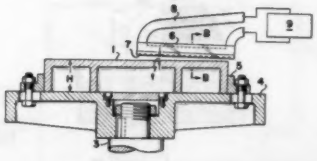
Filed Dec. 19, 1968, Ser. No. 785,106
Claims priority, application Japan, Dec. 26, 1967, 42/83,120; Dec. 30, 1967, 43/84,648, 43/84,649
Int. Cl. C21d *1/00*
U.S. Cl. 148—126 **2 Claims**

Sintered, cemented-carbide compositions, e.g., cobalt-bonded tungsten carbide, are hardened by permeating a boron-containing material into the surface of the sintered composition. This boronizing treatment can be effected, for example, by heating the composition with a solid form of the boron-containing material, or by electrolysis in a molten boron salt bath.

3,647,577
INDUCTION HARDENED, ANTI-WEAR MECHANICAL MEMBERS

Nobuyasu Gomada and Genzo Kosaka, Hiroshima-shi, Japan, assignors to Toyo Kogyo Co., Ltd., Hiroshima-ken, Japan

Filed Aug. 21, 1968, Ser. No. 754,340
Claims priority, application Japan, Aug. 30, 1967, 42/55,601; Sept. 14, 1967, 42/56,674
Int. Cl. C21d *1/10*
U.S. Cl. 148—150 **5 Claims**



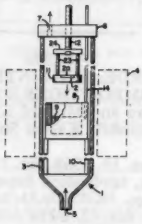
A mechanical member with a flat anti-wear surface with which a mating member moves in sliding contact wherein the member is partially induction hardened at the surface layer thereof in such manner as to form many separate hardened layers which are distributed in the surface layer radially and concentrically with respect to the center of the surface of the member; a process for the partial induction hardening of a flat member which comprises the steps of supporting an induction heating coil above a radius

vector of the surface layer to be partially hardened of the flat member so that an alternate magnetic flux density is kept uniform throughout the surface layer by applying a high frequency electric current intermittently through the heating coil to heat the layers to be hardened on said surface layer while revolving the member, and quenching the heated layers by a cooling medium thereby to form many separate hardened layers which are distributed as mentioned above.

3,647,578
SELECTIVE UNIFORM LIQUID PHASE EPITAXIAL GROWTH

Allen M. Barnett, Schenectady, Harold A. Jensen, Liverpool, and Virginia F. Meikleham, Syracuse, N.Y., assignors to General Electric Company

Filed Apr. 30, 1970, Ser. No. 33,353
Int. Cl. H01l 7/38
U.S. Cl. 148—171 **16 Claims**

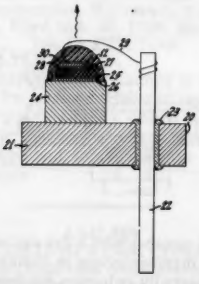


A process for performing liquid phase epitaxial growth of semiconductor material, particularly III–V compounds, providing both dissolution and growth of extremely uniform dimensions over a large area, and further wherein said epitaxial growth may be accomplished in a selective fashion. The process has significant application to an array fabrication of high efficiency light emitting diodes composed of III–V compound materials such as GaAs.

3,647,579
LIQUID PHASE DOUBLE EPITAXIAL PROCESS FOR MANUFACTURING LIGHT EMITTING GALLIUM PHOSPHIDE DEVICES

Ivan Ladany, Skillman, N.J., assignor to RCA Corporation

Filed Mar. 28, 1968, Ser. No. 716,970
Int. Cl. H05b 33/00; H01l 3/00, 7/38
U.S. Cl. 148—171 **9 Claims**



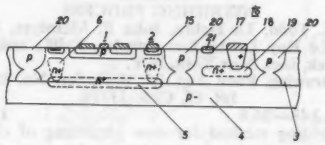
Gallium phosphide light emitting diodes with reproducible external quantum efficiencies greater than 1% are manufactured by successive liquid phase epitaxial growth of N type and P type layers on a gallium phosphide substrate which may be of either conductivity type.

The N type layer is grown first from a melt of tellurium and gallium phosphide in a gallium solvent. The P type layer is subsequently grown on the N type layer from a melt of zinc oxide, gallium oxide and gallium phosphide in a gallium solvent.

3,647,580
METHOD FOR THE MANUFACTURE OF A SOLID STATE CIRCUIT ADAPTABLE AS H.F. TUNER

Hans Weinerth, Eindhoven, Woensel, Netherlands, assignor to International Standard Electric Corporation, New York, N.Y.

Filed June 27, 1968, Ser. No. 740,727
Claims priority, application Germany, July 6, 1967, D 53,520
Int. Cl. H01l 3/00, 5/00, 11/00
U.S. Cl. 148—175 **4 Claims**



This is a method of manufacturing a monolithic H.F. tuner by forming low resistive regions which surrounds a planar transistor and a capacitive diode formed within the substrate. These low resistive regions are formed by subepitaxial diffusion of buried layers in two steps. These low resistive regions are responsible for reducing unwanted barrier layer capacitance and result in better control over the tuning characteristics of the device.

3,647,581
MANUFACTURE OF SEMICONDUCTOR DEVICES

Derek Hubert Mash, Harlow, Essex, England, assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed June 11, 1969, Ser. No. 832,360
Claims priority, application Great Britain, July 11, 1968, 33,042/68
Int. Cl. H01l 7/36
U.S. Cl. 148—175 **6 Claims**

A single crystal layer of semiconductor material, having a thickness greater than 50μ, has an electrically active region formed within one surface. The surface with the electrically active region is temporarily attached to a substrate, and semiconductor material is then removed from the opposite surface to form a layer having a thickness of less than 20μ. An epitaxially deposited layer on a substrate, with an electrically active region in said layer, may be similarly reduced in thickness by removing the substrate and a portion of said deposited layer to provide an unsupported single crystal of less than 20μ thickness.

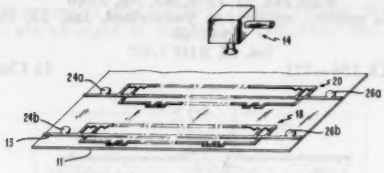
3,647,582
METHOD FOR LOCATING PRINTED CIRCUIT WORK PIECE

David T. Putnam, Raleigh, and William C. Tatum, Durham, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1969, Ser. No. 837,565
Int. Cl. H05k 1/00, 3/00
U.S. Cl. 156—3 **3 Claims**

A method for precision location of an etched pattern on a metal-clad plastic laminate for use with a machine

tool for punching, blanking, etc. by etching in the pattern, raised metallic surfaces, and positioning these metallic reference surfaces in fixtures forming a part of an instrumentality such as a machine tool.



3,647,583
METHOD OF MANUFACTURING A GLASS ARTICLE HAVING A LIGHT-DISPERSING LAYER

Hubertus Johannes De Rouw, Emmasingel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

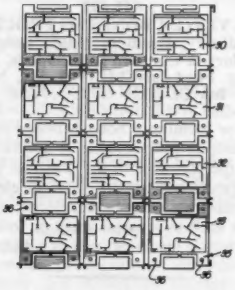
No Drawing. Filed Dec. 3, 1969, Ser. No. 881,877
Claims priority, application Netherlands, Dec. 10, 1968, 6817661
Int. Cl. C03c *15/02*
U.S. Cl. 156—6 **1 Claim**

The manufacture of a light-dispersing layer on the surface of BaO-containing glass, particularly the face plate of a television display tube by first polishing the surface with a polishing agent having a grain size of no more than 100μ and by subsequently treating it with a solution containing between 25 and 50% by weight of HF and between 15 and 50% by weight of HNO_3.

3,647,584
CHEMICAL MILLING PROCESS

Gregory A. Duffy, 15001 Altata Drive, Pacific Palisades. Calif. 90272

Filed Jan. 5, 1970, Ser. No. 624
Int. Cl. H05k *1/00;* **C23f** *1/02*
U.S. Cl. 156—11 **17 Claims**

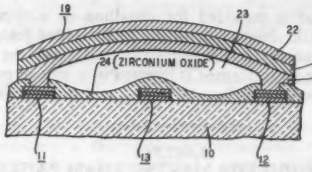


Improved chemical milling process and resulting product utilizing photographically exposed and developed resist designs on a metal plate with unexposed portions of the resist emulsion dissolved away, characterized by a baking step or steps harder than conventional, a series of controlled etching treatment on one side, and a series of differently controlled harsher etching treatment on the other side, resulting in a design of suspended metal areas having substantially flat plane or slightly concave etched edges as distinguished from shoulders or ridges. A particular application is for producing electrical circuitry utilizing a metallic plate containing identical circuit designs on both sides formed of the photographic etch resist, and upon removal of the unwanted metal by the differential etching steps on opposite sides of the plate, obtaining an integrated circuit structure with conductors responding to the etch resistant pattern and in cross section being substantially rectangular with parallel top and bottom and parallel sides, or with the sides very slightly concaved, thus providing adequate surfaces on the sides for attachment of wires by welding.

3,647,585
METHOD OF ELIMINATING PINHOLE SHORTS IN AN AIR-ISOLATED CROSSOVER

Larry B. Fritzinger, Piscataway, and Martin P. Lepselter, New Providence, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 23, 1969, Ser. No. 827,215
Int. Cl. H01l *7/50;* **H05k** *3/06*
U.S. Cl. 156—17 **4 Claims**

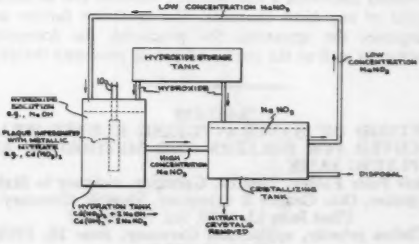


Pinhole shorts are eliminated in an air-isolated crossover by including a compressively stressed layer in the upper conductor. When a filler material between the upper and lower conductors is etched away, the stressed layer will expand, causing the upper conductor to arch away from the lower conductor and breaking any pinhole shorts between the two conductors.

3,647,586
METHOD OF HYDRATING A BATTERY PLAQUE IMPREGNATED WITH METAL NITRATE IN A HYDROXIDE SOLUTION AND SUBSEQUENT RECOVERY OF NITRATE BYPRODUCT AS CRYSTALS

Bernard C. Bergum, Monona, and Per S. Svardal, Madison, Wis., assignors to ESB Incorporated

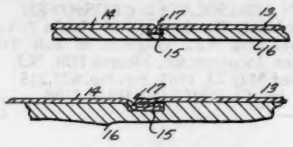
Filed Jan. 22, 1970, Ser. No. 4,824
Int. Cl. H01m *35/02*
U.S. Cl. 136—20 **6 Claims**



A battery plaque impregnated with a metal nitrate is hydrated by being submerged in a hot, concentrated hydroxide solution to produce a metal hydroxide deposit in the plaque and a hydroxide solution containing a nitrate byproduct. The hydroxide solution containing the nitrate

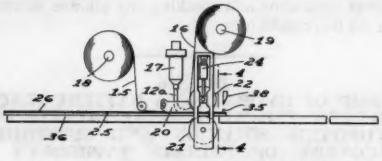
byproduct is transmitted to a crystallization tank where upon cooling nitrate crystals are formed and recovered. The solution remaining after crystallization may be returned to the hydration tank. Hydroxide solution may be added to maintain the hydroxide concentration in the hydration tank at a substantially uniform level. Both batch and continuous processing may be used.

3,647,587
METHOD OF INSTALLING INVISIBLE SEAMS
John Clifford MacDonald, Andover, Mass., assignor to Burlington Industries, Inc., Greensboro, N.C.
Filed June 23, 1969, Ser. No. 835,552
Int. Cl. E04f *15/10*
U.S. Cl. 156—71 **1 Claim**



A method is provided for installing on a supporting surface plastic sheets which have been bonded using radio frequency energy to dielectrically heat seal the sheets whereby the seam formed is inserted in a groove provided in the supporting surface to render said seam invisible.

3,647,588
METHOD FOR MAKING FOAM PANEL
James W. Greig, Grosse Pointe Park, Mich., assignor to Woodall Industries Inc.
Continuation-in-part of abandoned application Ser. No. 514,605, Dec. 17, 1965. This application Nov. 28, 1969, Ser. No. 880,745
Int. Cl. B32b *5/20*
U.S. Cl. 156—79 **8 Claims**

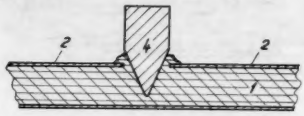


A process for making cellular foam sheets and panels embodying a preselected contour by foaming in situ a layer of a liquid reaction mixture deposited in a selected pattern of controlled thicknesses corresponding to the variations in thickness of the resultant contoured panel, providing therewith a substantially uniform cell structure devoid of any blow channels. The invention further encompasses the apparatus for practicing the foregoing process, as well as the improved panels produced thereby.

3,647,589
METHOD OF MANUFACTURING RUBBER WEAR COVER FOR ROLLERS AND METHOD OF APPLYING SAME
Alois Peter Felden, Munich, Germany, assignor to Stahlgruber, Otto Gruber & Company, Munich, Germany
Filed June 23, 1970, Ser. No. 49,057
Claims priority, application Germany, June 26, 1969, P 19 32 320.7
Int. Cl. B32b *31/00*
U.S. Cl. 156—165 **5 Claims**

A rubber cover for protecting conveyor belt rollers and return idlers is characterized by an outer wear resistant vulcanized rubber layer and an inner connecting layer of unvulcanized cold vulcanizable rubber mixture.

3,647,590
METHOD OF BENDING PLATES
Emanuel Wolf, Horgen, Switzerland, assignor to Swiss Aluminium Ltd., Chippis, Switzerland
Filed Jan. 22, 1970, Ser. No. 5,040
Claims priority, application Switzerland, Jan. 23, 1969, 947/69
Int. Cl. B31f *5/02*
U.S. Cl. 156—211 **11 Claims**



A method of bending a composite plate composed of an inner core of synthetic material and an outer strip of a second different material, on at least one side thereof, provides for removing a portion of said cover strip near the region of bending, thereby creating a groove at the bending region in the core, and heating the groove; the groove creating and heating may be carried out by a wedge shaped heating sword. Thereafter the plate is bent about the groove until the faces of the groove fuse and the ends of the cover strip meet.

3,647,591
ACID BONDING NONWOVEN FABRICS
Thomas S. Morris, Shawmut, Ala., assignor to West Point-Pepperell, Inc., West Point, Ga.
No Drawing. Filed Sept. 25, 1969, Ser. No. 861,191
Int. Cl. B29j *1/00*; B32b *5/02*
U.S. Cl. 156—220 **26 Claims**

A process for making a bonded nonwoven fabric from a blend of nylon fibers and fibers of another kind of material. The fibers are formed into a web which is treated with a concentrated solution of a strong acid which affects the nylon but does not substantially affect the other material. The nylon is softened and swollen by the concentrated acid. Then, the web is contacted with water which dilutes the concentrated acid and coagulates the nylon. Subsequently, the web is subjected to pressure. The acid treatment makes the nylon more susceptible to pressure but does not have this effect on the fibers of the other material. When pressure is applied, the nylon flows and causes the other fibers to be bonded to each other.

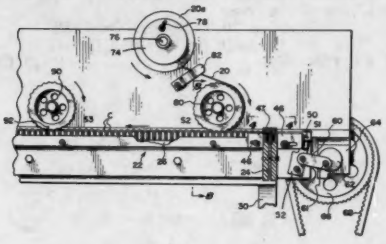
3,647,592
POLYESTER BONDING PROCESS
Paul T. Woodberry, Reading, Mass., assignor to P. R. Mallory & Co. Inc., Indianapolis, Ind.
No Drawing. Filed July 24, 1968, Ser. No. 747,069
Int. Cl. B32b *17/02, 17/04*
U.S. Cl. 156—285 **10 Claims**

A process for forming a bond between polyester and a substrate by heating the polyester in a vacuum and thereafter bonding the polyester to the substrate by the application of temperature and pressure and/or electric potential thereto. The substrate may be an electrical conductor or semiconductor such as a metal sheet or foil, or it may be an inorganic electric insulator such as a glass.

3,647,593
METHOD OF AND APPARATUS FOR PRODUCING UNIFORM LENGTHS OF RIBBON-CONNECTED FASTENER CLIPS
Harrison C. Lingle, Wilmette, and Arthur Langas, Glenview, Ill., assignors to Hartco Company, Wilmette, Ill.
Filed Dec. 1, 1969, Ser. No. 881,005
Int. Cl. B32b *31/10*; B65d *83/08*
U.S. Cl. 156—300 **4 Claims**

A method and fully automatic collating apparatus for producing uniform lengths of preformed, U-shaped,

ribbon-connected fastener clips, such lengths being suitable for loading into the magazine of a clip-clinching tool. The disclosed exemplary apparatus for practicing the method embodies a clip-receiving and stacking station to which successive clips are fed in endwise fashion, at which they are arranged in side-by-side contiguity, and from



which they are fed in a continuous stack to a ribbon-applying station. At the ribbon-applying station a rotatable transfer wheel impresses a continuous ribbon upon the crown portions of the clips and the thus connected continuous string of clips advances to a severing station where predetermined lengths of the ribbon-connected clips are severed and further impelled to a discharge station.

3,647,594

PROCESS FOR PRODUCING ARTIFICIAL LEATHER

Ernst Demme, Theodor Schachowskoy, Guenther Schuhmacher, and Juergen Fehlhaber, Weinheim, and Ludwig Hartmann, Ober-Flockenbach, Germany, assignors to Carl Freudenberg Kommanditgesellschaft, Weinheim, Germany

No Drawing. Continuation of application Ser. No. 405,292, Oct. 20, 1964. This application Jan. 20, 1970, Ser. No. 4,436

Claims priority, application Germany, Oct. 4, 1963, P 15 60 774.6

Int. Cl. B32b *5/16, 5/22*

U.S. Cl. 156—306 **16 Claims**

Process of producing artificial leather by applying a fusible cobweb fabric on to the major surface of a non-woven fabric substrate and then laminating the cobweb to the base fabric by heat and pressure.

3,647,595

METHOD FOR THE PRODUCTION OF DECORATIVE LAMINATES HAVING LOW TENDENCY TO FLAME-SPREADING

Nils B. Sundén, Perstorp, Sweden, assignor to Perstorp AB, Perstorp, Sweden

No Drawing. Filed July 8, 1968, Ser. No. 743,036

Claims priority, application Sweden, Sept. 1, 1967, 12,133/67

Int. Cl. C09j *3/14*

U.S. Cl. 156—331 **1 Claim**

A process for the production of decorative laminates having core sheets and decorative overlay sheets which comprises

coating a core of phenol-formaldehyde resin impregnated paper sheets containing an amine-phosphate as a fire retardant

with a resin selected from the group consisting of melamine-formaldehyde resin and urea-formaldehyde resin having dispersed therein

at least one member selected from the group consisting of polyvinyl chloride and polyvinylidene chloride and

at least one member from the group consisting of antimony trioxide and alumina

and disposing said coated core sheets immediately adjacent to the lowermost of said decorative overlay sheets, said decorative overlay sheets comprising paper sheets impregnated with a resin selected from the group consisting of melamine-formaldehyde resin and urea-formaldehyde resin.

3,647,596

APPARATUS FOR WET TREATMENT OF FILMS OR THE LIKE

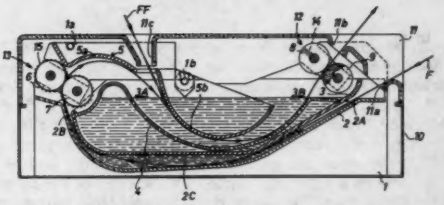
Kurt Thate and Jurgen Muller, Munich, Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 14, 1970, Ser. No. 2,791

Claims priority, application Germany, Jan. 17, 1969, P 19 02 216.3

Int. Cl. C23g *3/00*

U.S. Cl. 156—345 **14 Claims**



Apparatus for wet treatment of films or like sheet materials wherein a receptacle accommodates two superimposed vessels each containing a supply of liquid. One side of the receptacle has two openings one of which admits sheet material into the inlet of the lower vessel and the other of which receives treated material from the outlet of the upper vessel. A curved guide structure is provided in the receptacle at the other side of the receptacle to direct sheet material from the outlet of the lower vessel into the inlet of the upper vessel. A first pair of driven rollers advances sheet material between the outlet of the lower vessel and the inlet of the upper vessel, and a second pair of driven rollers advances sheet material between the outlet of the upper vessel and the other opening of the receptacle. A third opening is provided in the receptacle to direct sheet material directly into the inlet of the upper vessel.

3,647,597

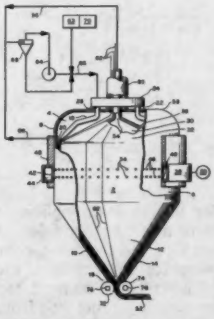
APPARATUS FOR FORMING A NON-WOVEN WEB

Raymond G. Voss and Ray D. Ramsay, Bartlesville, Okla., assignors to Phillips Petroleum Company

Filed Mar. 9, 1970, Ser. No. 17,397

Int. Cl. B29j *5/08*

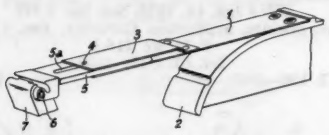
U.S. Cl. 425—83 **9 Claims**



An apparatus and method for laying down fibers in a cylindrical or modified cylindrical shape for forming a

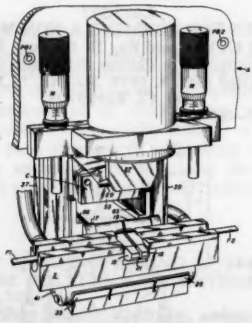
non-woven fiber web. Said apparatus has a rotating fiber conduit for placing fibers between two forming elements.

3,647,598
RADIAL TIRE MAKING DRUM
Georges Gazuit, Montlucon, France, assignor to NRM Corporation, Akron, Ohio
Filed Nov. 17, 1969, Ser. No. 877,359
Claims priority, application France, Nov. 27, 1968, 175,506
Int. Cl. B29h *17/26*
U.S. Cl. 156—415 **8 Claims**



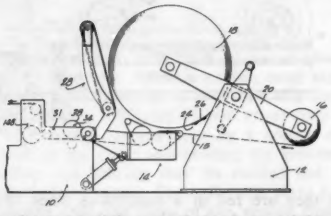
In this tire making drum of the rind type, described in the copending application Ser. No. 617,658, now abandoned in favor of applicant's continuation application Ser. No. 28,281, filed Apr. 22, 1970, entitled "Tire Building Machine," each one of the two ends of each spring blade is shaped for receiving a rigid sliding pull member of which the outer end carries means for pivotally connecting same to a pivot pin carried by the edge of the corresponding flange. The cavity receiving said rigid pull member is formed at either end of the spring blade by a shorter spring blade secured to the former and extending parallel thereto along a distance determined by a small distance piece, said pull member being flat and having a width preferably equal to that of said spring blades; it is guided for longitudinal sliding movement therebetween and retained in either of two end positions by the distance-piece engaging an elongated aperture formed in said pull member.

3,647,599
ULTRASONIC FILM SPLICING APPARATUS
Ray E. Gardner, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed June 16, 1969, Ser. No. 833,438
Int. Cl. B31f *5/00;* **B29c** *27/08;* **G03d** *15/04*
U.S. Cl. 156—502 **12 Claims**



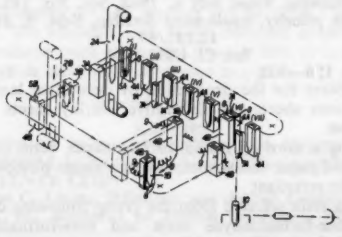
Apparatus for ultrasonically splicing together end-to-end two lengths of moving picture film or the like with a patch of splicing tape therebetween, comprising an ultrasonic horn, a stage for the lengths of film which is movable toward and away from the horn, tape feeding mechanism for intermittently feeding tape from a roll into position on the surface of said horn, and mechanism for cutting a patch of the desired width from the end of said tape. The stage and the horn are provided with vacuum apertures for holding the films and the patch in place. An automatic control system acts to perform the operating steps in the necessary sequence.

3,647,600
UNIVERSAL WEB SPLICER
George Vischulis, Menomonee Falls, and Charles K. Sedlak, Wauwatosa, Wis., assignors to Zerand Corporation, New Berlin, Wis.
Filed Jan. 20, 1970, Ser. No. 4,188
Int. Cl. B65h *19/16;* **G03d** *15/04*
U.S. Cl. 156—504 **13 Claims**



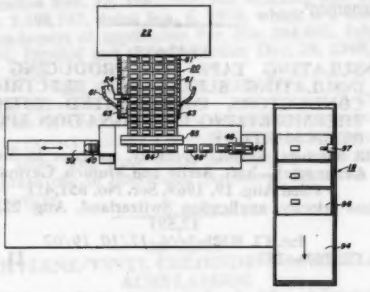
A universal tape applying apparatus for applying tape to both sides of a butt joint formed in a running web and between a new web and an expiring web. The apparatus includes a top tape applying roll assembly and a bottom tape applying roll assembly, each roll assembly having a tape roll in the form of a cylinder with a flat side or section on its outer periphery and a tape carrier spirally mounted on the remaining portion of the outer periphery of the tape roll at an angle conforming to the angle of the butt joint splice. The tape rolls are accelerated to the speed of the running web by air cylinders which are preloaded and pressurized to provide a thrust (torque) force to thereby accelerate the tape rolls to the speed of the running web. The air cylinder for the top tape roll is released on a given signal to provide a thrust force to the top tape roll through a pawl and ratchet assembly. Release of the air cylinder for the bottom tape roll is synchronized with the movement of the top tape roll through a mechanical linkage to provide a thrust force through a ratchet and pawl assembly.

3,647,601
APPARATUS FOR THE AUTOGENOUS BONDING OF CONTRACEPTIVE SHEATHS
Francis Douglas Berry, Theydon Bois, and Stanley Charles Blyther, North Weald, England, assignors to LR Industries Limited, London, England
Filed Nov. 12, 1969, Ser. No. 875,894
Claims priority, application Great Britain, Aug. 17, 1969, 41,323/69
Int. Cl. B32b *31/18*
U.S. Cl. 156—511 **6 Claims**



Contraceptive sheaths are made from thermoplastic film material by forming two substantially identical blanks each corresponding in shape to the shape of the required sheath and welding the edges of the blanks together except at the intended open end of the sheath.

3,647,602
SELECTIVE ARTICLE LABELING CONTROL FORM
John V. McGuire, Deerfield, and Donald W. Watson, Arlington Heights, Ill., assignors to Xerox Corporation, Rochester, N.Y.
Filed Nov. 10, 1969, Ser. No. 875,006
Int. Cl. B43m *11/00*
U.S. Cl. 156—528 3 Claims

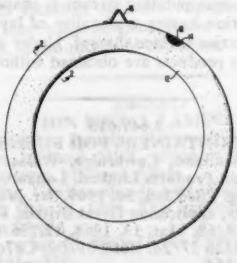


An article labeling system including article supply means; an addressing machine with article labeling head, said labels being in the form of an endless sheet-like piece having at least one label row with a control tape portion bearing control data for individual labels extending therealong; and means for operating the labeling system in accordance with the control data on the label form control tape.

3,647,603
COLD-FORMABLE DECORATIVE LAMINATE AND METHOD OF MAKING SAME
Pascal E. Esemplare, Mountainside, and Charles P. West, Metuchen, N.J., assignors to Vi-Vox, Incorporated, Pittsburgh, Pa., and Frankel Company, Incorporated, Detroit, Mich., fractional part interest to each
No Drawing. Filed Jan. 6, 1969, Ser. No. 789,420
Int. Cl. B32b *15/08, 27/42;* D06n *7/00*
U.S. Cl. 161—5 11 Claims

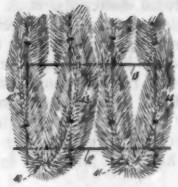
A cold post-formable, sheet-like, decorative laminate of high chemical-, abrasion-, heat-, and crack-resistance, comprising a flexible metal base sheet, a paper interlayer bonded to the metal and to a flexible surface layer comprising a thermosetting mixture of melamine formaldehyde resin and alkyd resin.

3,647,604
REINFORCED FOAMED PLASTIC WREATH RING
Leonard W. Schoenherr, Robert O. Schoenherr, and John W. Schmock, Ludington, Mich., assignors to Foliage Co. of America, Ludington, Mich.
Filed Nov. 4, 1969, Ser. No. 873,955
Int. Cl. A47g *33/08, 33/10*
U.S. Cl. 161—15 8 Claims



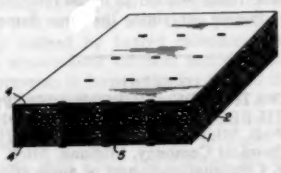
This disclosure relates to a wreath ring comprising an annular ring formed of foamed plastic material reinforced with a metal band in compressive relationship thereto and positioned within an annular circumferential depression in the annular ring. A hook is formed in the shape of a loop with the ends thereof extending along the circumference of the annular ring and fixed to the metal band.

3,647,605
ARTIFICIAL PLANT UTILIZING A THREE-DIMENSIONAL SHELL FRAMEWORK
Si I. Spiegel, Briarcliff, N.Y., assignor to American Technical Industries, Inc., New York, N.Y.
Filed Jan. 14, 1970, Ser. No. 2,853
Int. Cl. A47g *33/04*
U.S. Cl. 161—31 17 Claims



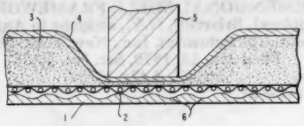
An artificial tree or bush utilizing a three-dimensional shell or basket-like framework having the general shape of the tree or bush. The framework is comprised of upstanding rods or wire stringers attached to a series of horizontal members, the upstanding rods and horizontal members thus providing a gridwork of wires to which artificial branches can be attached. The foliage of the bush or tree is comprised of a plurality of needle, flower or leaf-bearing branches bent into a general U shape and attached to the gridwork so that each such branch provides two outwardly and upwardly extending extremities. The branches are overlapped upon the framework so that the U-shaped base portions of the branches and the framework are hidden by the outwardly extending branch ends of lower branches.

3,647,606
SEMIRIGID MULTILAYER THERMAL INSULATION AND METHOD OF MAKING SAME
Frank Notaro, Buffalo, N.Y., assignor to Union Carbide Corporation, New York, N.Y.
Filed Nov. 21, 1969, Ser. No. 878,855
Int. Cl. B32b *7/08*
U.S. Cl. 161—52 22 Claims



A multilayer thermal insulation semirigidized to resist compression and bending by means of a plurality of spaced, thin columns which extend through the insulation layers and are bonded to at least some of said layers.

3,647,607
HIGH FREQUENCY WELDING OF POLYVINYL CHLORIDE FOAMS TO PERFORATED MATERIALS
Theo Hillers, Troisdorf, Germany, assignor to Dynamit Nobel AG, Troisdorf, Germany
Filed June 5, 1970, Ser. No. 43,724
Claims priority, application Germany, June 6, 1969, P 19 28 662.5
Int. Cl. B32b *3/30, 5/18, 31/06*
U.S. Cl. 161—89 **13 Claims**



The high frequency welding of polyvinyl chloride foams to sievelike perforated materials, such as tricot, nettle cloth, perforated films and the like, is conducted in order to obtain a high welding seam strength by providing the side of the insulating layer facing the material to be welded with numerous, relatively small projections and/or depressions. The PVC foam, heated and plasticized by the high frequency current, penetrates through the fabric to between the projections or into the depressions and thus becomes mechanically anchored in the fabric after cooling.

3,647,608
CUT-RESISTANT FOAM ARTICLE
Dale S. Enlow, Cuyahoga Falls, and Lawrence C. Varner, Jr., Akron, Ohio, assignors to The General Tire & Rubber Company
No Drawing. Filed Jan. 26, 1970, Ser. No. 5,934
Int. Cl. B32b *3/26, 5/14, 5/18*
U.S. Cl. 161—95 **9 Claims**

Slashing and cutting of foam seats has been one of the principal aspects of vandalism of public and private property. Efforts to protect foam seats from cutting have not been successful because of the high costs involved and the general decrease in comfort arising from use of armor. This situation has caused many seat manufacturers to change to cut-proof, rigid seats. This invention is a cut-resistant foam article, such as a seat, that retains the desirable degree of resiliency and comfort and a method of making the article.

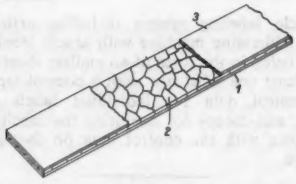
3,647,609
FLAME RETARDED COMPOSITE
Henryk A. Cyba, Evanston, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.
No Drawing. Filed Sept. 26, 1969, Ser. No. 861,495
Int. Cl. B32b *5/18, 27/40*
U.S. Cl. 161—160 **8 Claims**

A flame retarded composite of plastic, resin or foam bonded to a solid material by means of a flame retarded adhesive, the flame retardant in both materials being of similar chemical composition. An example is flame retarded urethane foam bonded to flame retarded urethane foam by an adhesive containing the same flame retardant as in the foam.

3,647,610
PRESERVATION OF AQUEOUS DISPERSIONS WITH BROMOCYANOACETAMIDES
Paul A. Wolf, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.
No Drawing. Continuation-in-part of application Ser. No. 650,264, June 30, 1967. This application July 31, 1970, Ser. No. 60,095
Int. Cl. D21h *5/22*
U.S. Cl. 162—161 **19 Claims**

A method useful for preserving aqueous dispersions of biodegradable cellulosic matter such as wood pulp suspensions from microbial attack comprises adding to the dispersion an antimicrobial amount of a bromocyanoacetamide compound such as 2,2-dibromo-2-cyanoacetamide. In a preferred embodiment, the method comprises the further step of treating the dispersion to which the bromocyanoacetamide compound has been added with sufficient of a base to inactivate such compound prior to discharging any of the dispersion into the environment.

3,647,611
INSULATING TAPE FOR PRODUCING AN INSULATING SLEEVE FOR ELECTRICAL CONDUCTORS, IMPREGNATED WITH A THERMOSETTING IMPREGNATION EPOXY RESIN MIXTURE
Willi Mertens, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany
Filed Aug. 19, 1969, Ser. No. 851,411
Claims priority, application Switzerland, Aug. 22, 1968, 12,597
Int. Cl. B32b *5/16, 17/10, 19/02*
U.S. Cl. 161—163 **11 Claims**



As a binder for an accelerator containing mica tape for producing the micalastic insulation, I use polymerizable additives of acid components, containing at least one polymerizable double compound, and epoxide compounds to which organic peroxides are added. This binder is self hardening in the impregnation resin.

3,647,612
MULTILAYER PLASTIC ARTICLES
Walter J. Schrenk, Bay City, and Douglas S. Chisholm, Kenneth J. Cleereman, and Turner Alfrey, Jr., Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.
Application June 6, 1969, Ser. No. 863,729, now Patent No. 3,576,707, dated Apr. 27, 1971, which is a continuation of application Ser. No. 445,851, Mar. 29, 1965, which in turn is a continuation-in-part of application Ser. No. 431,336, Feb. 9, 1965. Divided and this application Sept. 15, 1970, Ser. No. 72,445
Int. Cl. B32b *7/02, 27/08*
U.S. Cl. 161—165 **3 Claims**

Multiple layer films are made by arranging a minimum of two streams into one stream having a plurality of generally parallel layers. By mechanically manipulating the layered stream an increased number of layers are obtained and the manipulating stream is shaped into a desired configuration having a plurality of layers generally adjacent to a major surface thereof. Under certain conditions, iridescent products are obtained without the use of pigment.

3,647,613
PLASTICS CONTAINERS FOR FUEL STORAGE
John Louis Scotland, Cowbridge, Wales, assignor to British Resin Products Limited, London, England
No Drawing. Filed Jan. 30, 1969, Ser. No. 795,339
Claims priority, application Great Britain, Feb. 2, 1968, 5,329/68; Mar. 13, 1968, 12,156/68
Int. Cl. B32b *27/28;* **B65d** *89/00;* **C07c** *21/08*
U.S. Cl. 161—165 **6 Claims**

Containers for petroleum hydrocarbons made from high density polyethylene having a surface fluorinated to

a concentration of 0.01 to 30 micrograms of fluorine per square centimetre.

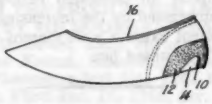
3,647,614
IMPACT MOLDED ARTICLE
Kenneth J. Cleereman, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.
Application Feb. 13, 1967, Ser. No. 615,535, now Patent No. 3,488,747, dated Jan. 6, 1970, which is a continuation-in-part of application Ser. No. 384,641, July 23, 1964. Divided and this application Dec. 29, 1969, Ser. No. 1,935
Int. Cl. B29c *3/00;* B32b *5/14*
U.S. Cl. 161—166 3 Claims

Articles of unique structural properties are manufactured by impact molding a plurality of multiphase thermoplastic slugs, said slugs being flattened by impact force and spread out in interleafed fashion to form the walls of the article.

3,647,615
ETHYLENE/VINYL CHLORIDE/N-METHYLOL ACRYLAMIDE
William F. Fallwell, Jr., St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.
No Drawing. Filed July 16, 1970, Ser. No. 55,613
Int. Cl. B32b *17/04, 21/28*
U.S. Cl. 161—170 16 Claims

Ethylene/vinyl chloride/N-methylol acrylamide terpolymer useful as bonding agent for nonwoven fibrous products.

3,647,616
STIFFENER AND PROCESS FOR STIFFENING FLEXIBLE SHEET MATERIAL
John C. Zemlin, Reading, Mass., assignor to USM Corporation, Boston, Mass.
Continuation-in-part of application Ser. No. 787,175, Dec. 26, 1968. This application Feb. 6, 1970, Ser. No. 9,168
Int. Cl. A43b *13/42;* B31f; B32b *27/40*
U.S. Cl. 161—190 11 Claims

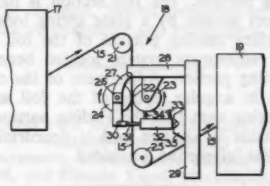


Stiffener and stiffening process for flexible sheet material, particularly for parts of shoe uppers in which the novel stiffener is a normally stiff, resilient cross-linked cured polyurethane sheet with a layer of heat-activatable adhesive on its surface. The stiffener is heated to activate the adhesive and soften the polyurethane sheet to a rubbery state, the heated stiffener is pressed against a sheet material to establish adhesive engagement and the assembly of sheet material and stiffener is shaped and cooled to resilient, shape-retaining condition.

3,647,617
THIN METAL LAMINATES
James K. Rieke, Douglas Raymond Behr, and Otis R. McIntire, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.
No Drawing. Continuation-in-part of application Ser. No. 586,372, Oct. 13, 1966. This application May 4, 1970, Ser. No. 34,616
Int. Cl. B32b *15/08;* C09j *3/14*
U.S. Cl. 161—216 9 Claims

A thin metal laminate useful, for example, as household foil comprising two thin metal layers such as aluminum bonded together with an adhesive polymer layer such as a copolymer of ethylene and acrylic acid is produced by forming a composite of the two metal layers with the adhesive polymer layer disposed between the metal layers, subjecting the composite to heat and pressure to form a bond between the metal layers and the adhesive polymer layer and thereby produce a laminate, and rolling the laminate at a temperature of not more than about 75° C. to reduce the thickness of the laminate at least about 5 percent.

3,647,618
METHOD AND APPARATUS FOR IMPROVING FORMATION UNIFORMITY OF PAPER
Sangho E. Back and Rueben A. Marti, Vancouver, Wash., assignors to Crown Zellerbach Corporation, San Francisco, Calif.
Filed Aug. 18, 1969, Ser. No. 850,861
Int. Cl. D21f *5/00*
U.S. Cl. 162—205 10 Claims



To improve the formation properties of a nonwoven web of cellulosic fiber, the web is dried to a moisture content of between 18–40% moisture and advanced through a pressure nip between a pair of opposed rolls. The rolls are each very slightly resilient but have a hard surface of between 0 and 10 P & J Plastometer ⅛" ball).

The pressure nip compaction also contributes to densification, improved surface smoothness and improved uniformity of fiber distribution.

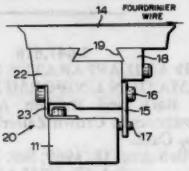
3,647,619
HIGH PRESSURE CALENDERING OF A PAPER WEB BETWEEN HEATED CALENDER ROLLS HAVING NON-RESILIENT SURFACES
Richard C. Mack, George Lejnieks, and Edward D. Morrison, Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Nov. 10, 1969, Ser. No. 875,230
Int. Cl. D21f *11/00*
U.S. Cl. 162—206 5 Claims

High density paper which has high surface smoothness and high gloss and is especially well adapted for use as a photographic paper is prepared by hot calendering a paper web, with the web being passed through at least one nip defined by heated calender rolls having hard smooth non-resilient surfaces and directed along a path which prevents it from wrapping around the heated rolls. The desired combination of physical properties in the paper is obtained by exerting a pressure on the web in the range from about 10,000 to about 50,000 pounds per square inch while maintaining the heated calender rolls with a surface temperature in the range from about 250° F. to about 500° F. and providing an initial water content in the web which is at least about two percent by weight but is below the water content at which blistering of the paper occurs.

3,647,620
DRAINAGE FOIL FOR A PAPERMAKING MACHINE

Leslie Truxa, Montreal, Quebec, Canada, assignor to Dominion Engineering Works, Limited, Lachine, Quebec, Canada

Filed May 2, 1969, Ser. No. 821,218
Claims priority, application Canada, May 14, 1968, 19,919
Int. Cl. D21f 1/48
U.S. Cl. 162—211 10 Claims

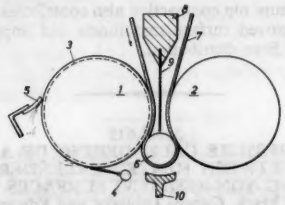


A drainage foil which includes a non-flexing foil section having a top surface leading portion and a top surface trailing portion. The foil section is mounted on a lower support section by a plate spring located beneath the top surface leading portion of the foil section and a cam bar adjustment system located beneath the top surface trailing portion. Adjustment of the cam bar system results in angular tilting of the foil section about the plate spring such that the leading portion of the foil section remains in contact with a fourdrinier wire but bending of the foil section is avoided.

3,647,621
ROLLER PRESS, ESPECIALLY A WASHING PRESS FOR PAPER MACHINE FELTS, HAVING A FLOATING ROLLER

Christian Schiel, Heidenheim, Germany, assignor to J. M. Voith, GmbH, Heidenheim (Brenz), Germany

Filed Oct. 27, 1969, Ser. No. 869,831
Int. Cl. D21f 7/12
U.S. Cl. 162—274 9 Claims



The specification discloses a roller press for pressing out wet felts and having two larger pressure rollers rotating on parallel axes and spaced apart and a smaller intermediate roller which is located between the two larger pressure rollers so as to define two nips and which intermediate roller is offset to one side of the common plane containing the axes of the two larger rollers. The felt to be pressed out extends through the first nip between the larger roller and the intermediate roller, directly envelopes the smaller roller and then goes back through the second nip thus forming the entire support for the smaller roller. The smaller roller may be formed in axial segments rotatable relative to each other and contoured to compensate for improper movement of the felt. A suction box can be coordinated to the press to exert suction on the press in the region where the felt passes around the smaller intermediate roller. The two pressure rollers can be interconnected so the roller on the side where the felt leaves the press runs slightly faster than the pressure roller where the felt enters the press and whereby the felt is additionally tensioned within the press. At least one of the larger pressure rollers can be peripherally grooved and the intermediate roller can be perforated and have air supplied to the inside thereof while, furthermore, the larger pressure rollers can be perforated and subjected to internal suction. The larger rollers may be provided with deflection compensating devices.

3,647,622
FUEL ELEMENT FOR A NUCLEAR REACTOR

Harry N. Andrews, Export, and John F. Patterson and John F. Wilson, Murrysville, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 13, 1968, Ser. No. 752,299
Int. Cl. G21c 3/04
U.S. Cl. 176—68 6 Claims

A metallic clad sealed fuel element for a nuclear reactor which may be initially pressurized to resist creep collapse in the early stages of burnup and which has one or more normally sealed plenum chambers which are automatically punctured when predetermined increased pressures are reached during burnup to provide void space for fission gases. In one example, the plenum chambers each comprise an elongated bellows-like structure which when compressed by the increasing pressures within the fuel element cause a wall thereof to be punctured by an internally mounted pin.

3,647,623
FUEL ELEMENT FOR A NUCLEAR REACTOR

Michael B. L. Hepps, North Versailles, and Harry M. Ferrari, Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 26, 1969, Ser. No. 802,544
Int. Cl. G21c 3/04
U.S. Cl. 176—68 4 Claims

A metallic clad fuel element for nuclear reactors which has a bellows-like member internally supported therein and communicably coupled with the environment of the

fuel element so as to maintain an internal pressure substantially equal to the external or environmental pressure during burnup and load follow. The bellows-like member is preferably constructed of a material with a relatively high modulus of elasticity so that it may readily expand and contract to compensate for the amount of fission gas given off by the fuel during burnup.

3,647,624

TREATMENT OF BLOOD WITH OLEAGINOUS SUBSTANCE

Merle A. Evenson, Madison, Wis., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed July 24, 1969, Ser. No. 844,426
Int. Cl. A61k *27/10*
U.S. Cl. 195—1.8 20 Claims

Method and means for the treatment of blood and other body fluids to add or subtract ingredients with respect to the blood by passing the blood in liquid-liquid contact with an immiscible oleaginous material.

3,647,625

METHOD OF REDUCING RAFFINOSE CONTENT OF BEET MOLASSES

Hideo Suzuki, Yoshiko Ozawa, and Osamu Tanabe, Chiba-shi, Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

No Drawing. Filed Mar. 5, 1968, Ser. No. 710,679
Claims priority, application Japan, Apr. 5, 1967, 42/21,629
Int. Cl. C12b *1/00*
U.S. Cl. 195—11 2 Claims

When α-galactosidase is formed in the mycelium of *Mortierella vinacea* var. *raffinoseutilizer* (ATCC No. 20034), it is substantially free from invertase. Mycelial matter taken from this mold and preparation containing the enzyme may thus be added to sugar beet juice or beet molasses for reducing the raffinose content of the same, thereby greatly increasing the recovery of sucrose content.

3,647,626

PROCESS FOR THE PRODUCTION OF ADENOSINE BY MICROORGANISMS

Osamu Shoji, Ikeda-shi, Jouji Hironaka, Takatsuki-shi, and Hirotada Kotani, Sakai-shi, Japan, assignors to Dainippon Pharmaceutical Co., Ltd., Osaka, Japan

No Drawing. Filed Jan. 19, 1966, Ser. No. 521,522
Claims priority, application Japan, Jan. 25, 1965, 40/3,949
Int. Cl. C12d *13/06*
U.S. Cl. 195—28 N 2 Claims

A process for the production of adenosine which employs microorganisms of genus Sarcina which are cultured in a medium containing sources of carbon, nitrogen, inorganic salts, and adenine and subsequently accumulating and separating the adenosine formed in the fermented medium.

3,647,627

PROCESS FOR PRODUCING FLAVIN-ADENINE DINUCLEOTIDE

Masao Tanaka, Machida-shi, Nobuo Nakamura, Tokyo, and Seigo Takasawa, Machida-shi, Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

No Drawing. Continuation of application Ser. No. 569,814, Aug. 3, 1966. This application July 12, 1968, Ser. No. 744,296
Claims priority, application Japan, Aug. 13, 1965, 40/48,942
The portion of the term of the patent subsequent to May 20, 1986, has been disclaimed
Int. Cl. C12d *13/06*
U.S. Cl. 195—28 N 15 Claims

Flavin-adenine dinucleotide is produced by fermentation. A microorganism of Brevibacterium, Micrococcus, Corynebacterium or Flavobacterium is cultured in an aqueous medium under aerobic conditions at 20°–40° C. The product is recovered by ion-exchange resin treatment.

3,647,628

PROCESS FOR PRODUCING L-THREONINE

Kiyoshi Nakayama, Sagamihara-shi, Japan, assignor to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

No Drawing. Filed Oct. 24, 1968, Ser. No. 770,387
Claims priority, application Japan, Aug. 17, 1968, 43/58,239
Int. Cl. C12d *13/06*
U.S. Cl. 195—29 3 Claims

A process for producing L-threonine by fermentation which comprises culturing a microorganism which requires methionine for its growth under aerobic conditions in an aqueous nutrient medium containing (1) the required amount or more of nitrogen sources necessary for the growth of the microorganism and (2) the required amount or less of methionine for the maximum growth of the microorganism. Advantageously, at least 5 parts by weight of nitrogen per 100 parts of carbon are employed in the medium. Strains belonging to Aerobacter, Pseudomonas, Arthrobacter and Escherichia are exemplified.

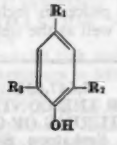
3,647,629

PROCESS FOR DEMETHOXYLATION BY MICRO-ORGANISMS

Atsushi Yamamoto, Machida-shi, Tairiku Omori, Kitakyushu-shi, and Hiroshi Yasui, Machida-shi, Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

No Drawing. Continuation of application Ser. No. 617,057, Feb. 20, 1967. This application June 14, 1968, Ser. No. 736,980
Int. Cl. C12d *13/00*
U.S. Cl. 195—30 13 Claims

The present disclosure relates to a process for the demethoxylation of certain organic compounds, particularly benzoic acid and benzaldehyde derivatives having the formula



wherein R_1 is CHO or COOH, R_2 is OCH_3 and R_3 is H, OH or OCH_3. This is accomplished by culturing a micro-organism capable of splitting off a methoxyl group, for example, those of the genera Saccharomyces or Torula, under aerobic conditions in an aqueous nutrient medium containing the compound to be demethoxylated.

3,647,630

ENZYMATICALLY ACTIVE COMPOSITION HAVING AN INSOLUBILIZED PROTEASE ENZYME COVALENTLY BONDED TO A WATER INSOLUBLE POLYANHYDROGLUCOSE

Neal E. Franks, Greenhills, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

No Drawing. Filed Sept. 29, 1969, Ser. No. 862,072
Int. Cl. C08g *7/02*
U.S. Cl. 195—63 R 4 Claims

An enzymatically active, water-soluble composition is provided consisting essentially of (1) a protease enzyme covalently bonded to a water-insoluble matrix which is a diazotized anthranilate ester of a polyanhydroglucose compound. The composition is useful for applications

where it is desired to employ a water-insoluble enzymatically active catalyst having a preformed matrix with good mechanical characteristics and specifically selected enzyme activity.

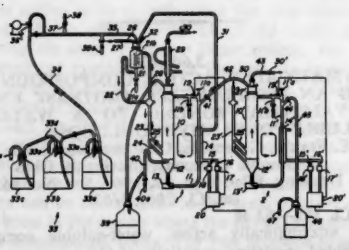
3,647,631
METHOD FOR PRODUCING TRIOSTIN
Ken Katagiri, Ikeda-shi, Japan, assignor to Shionogi & Co., Ltd., Osaka, Japan
No Drawing. Filed Feb. 19, 1968, Ser. No. 706,678
Int. Cl. C12d 9/00
U.S. Cl. 195—80 **3 Claims**

A method for producing an antibiotic, triostin, having antibacterial properties, characterized by cultivating *Streptomyces triostinicus*, n. sp. ATCC No. 21,043, in an aqueous nutrient medium under a submerged aerobic condition, recovering from the cultured broth a triostin complex consisting substantially of triostin A, triostin B and triostin C and, if desired, isolating each component of the triostin complex.

3,647,632
APPARATUS FOR CELL CULTURE
Dennis E. Johnson, Cambridge, and Lawrence R. Woodland, Sudbury, Mass., Charles J. Kensler, North Hampton, N.H., and Philip Himmelfarb, Wayland, Mass., assignors to Arthur D. Little, Inc., Cambridge, Mass.
Filed Apr. 11, 1968, Ser. No. 720,711
Int. Cl. C12b 1/10
U.S. Cl. 195—142 **6 Claims**

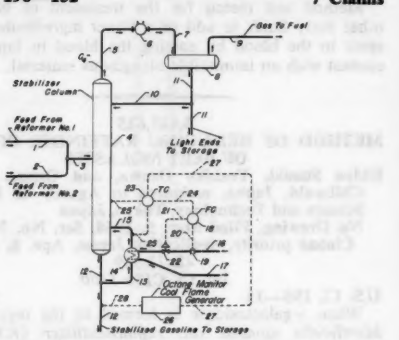
Method and apparatus for handling cells which may be microorganisms or may be derived from the tissues of living organisms. The method and apparatus permit growing such cells in an active growth state to population densities which may be from 2 to 35 times the densities now possible with present methods and equipment. The cells are maintained suspended in a liquid medium in which is placed a rotating filter. Liquids may be introduced and withdrawn without disturbing the cells. Cell densities may be built up to a high level and used as model tissues to determine the effect of chemical agents on them under conditions which are similar to those in living organisms. The method and apparatus are also suitable for carrying out large-scale industrial processes including the synthesis of organic chemicals as well as the treatment of sewage.

3,647,633
APPARATUS FOR THE CONTINUOUS PHASED CULTURING OF CELLS
Peter S. S. Dawson, Saskatoon, Saskatchewan, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Ontario, Canada
Original application Nov. 22, 1967, Ser. No. 689,231, now Patent No. 3,419,473, dated Dec. 31, 1968. Divided and this application Aug. 16, 1968, Ser. No. 810,397
Int. Cl. C12b 1/20
U.S. Cl. 195—139 **3 Claims**



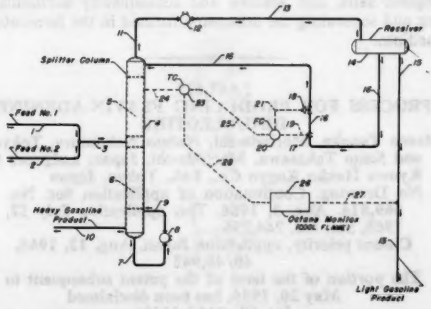
A method of improving or maintaining the phasing of cells in a cell culture by growing the cell culture at a predetermined rate in a nutrient medium which is present in an amount sufficient only for the cells in the cell culture to complete their cycle and at the doubling time of the cell culture i.e. the time when from 70 to 90% of the cells are on the point of dividing, adding further cell culture medium to at least a portion of the cell culture such that the cells have sufficient medium for completion of a further cycle.

3,647,634
OCTANE NUMBER CONTROL OF DISTILLATION COLUMN BOTTOMS BY VARYING HEAT INPUT
Walter A. Bajek, Lombard, and James H. McLaughlin, La Grange, Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.
Filed Oct. 22, 1969, Ser. No. 868,458
Int. Cl. B01d 3/42
U.S. Cl. 196—132 **7 Claims**



A fractional distillation column operating as a gasoline stabilizer or splitter is controlled by measuring the octane number of the column bottoms and adjusting the heat input to the column in response to the octane number. The octane measurement is effected by the analyzer comprising a stabilized cool flame generator with servo-positioned flame front which provides a real time output signal indicative of sample octane number.

3,647,635
OCTANE NUMBER CONTROL OF DISTILLATION COLUMN OVERHEAD BY VARYING REFLUX
Walter A. Bajek, Lombard, and James H. McLaughlin, La Grange, Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.
Filed Oct. 22, 1969, Ser. No. 868,459
Int. Cl. B01d 3/42; C10g 7/00
U.S. Cl. 196—132 **7 Claims**



A fractional distillation column operating as a gasoline splitter is controlled by measuring the octane number of the column overhead fraction and adjusting the reflux

to the column in response to the octane number. The octane measurement is effected by an analyzer comprising a stabilized cool flame generator with servo-positioned flame front which provides a real time output signal indicative of sample octane number.

3,647,636

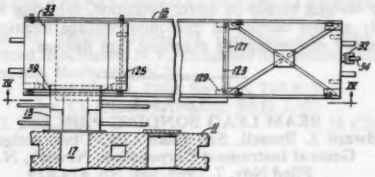
SYSTEM FOR COLLECTING DUST AND SMOKE WHEN COKE IS PUSHED FROM A COKE OVEN

Edward J. Helm, Pittsburgh, Pa., assignor to Koppers Company, Inc.

Continuation-in-part of application Ser. No. 840,447, Oct. 13, 1969. This application Jan. 19, 1970, Ser. No. 3,769

Int. Cl. C10b *33/00*

U.S. Cl. 202—263 13 Claims



A hood is movably mounted to a coke quenching car and cooperates with a coke guide that keeps the hood in place relative to the coke guide as the coke quenching car moves relative to the hood. Dust and smoke from pushed coke passing through the hood are collected in the hood. Gas scrubbing equipment is associated with the coke guide and the hood to remove particulate matter from the gasses collected in the hood.

3,647,637

DISTILLATION OF STYRENE WITH ADDITION OF POLYMERIZATION INHIBITOR

Robert H. Rosenwald, Western Springs, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

No Drawing. Filed Aug. 27, 1970, Ser. No. 67,613

Int. Cl. B01d *3/34*

U.S. Cl. 203—9 5 Claims

Stabilizing styrene during distillation thereof by effecting the distillation in contact with a dehydrogenation catalyst.

3,647,638

ASCENDING MULTI-STAGE DISTILLATION APPARATUS AND METHOD UTILIZING A FEED-LIQUID-LIFT SYSTEM

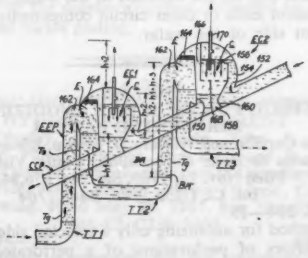
Asriel Osdor, Tel Aviv, Israel, assignor to Hydro Chemical & Mineral Corp., New York, N.Y.

Filed July 5, 1968, Ser. No. 742,865

Claims priority, application Israel, July 17, 1967, 28,336

Int. Cl. B01d *3/06, 1/14*

U.S. Cl. 203—11 7 Claims



A multi-stage distillation system, particularly useful for desalination of sea water, is described comprising a plurality of evaporators and condensers disposed at elevations increasing from the first stage of highest temperature and pressure to the last stage of lowest temperature and pressure, the feed liquid being moved upwardly against gravity through the evaporators by the energy of vaporization and difference in pressure between stages, and the cooling liquid moving downwardly by gravity through the condensers against increasing pressure. A feed-liquid-lift system is described including a down-flowing liquid column of the feed liquid continuously driving a longer up-flowing boiling-mixture column of the feed liquid mixed with vapor, while liquid at the lower end of the up-flowing boiling-mixture column continuously effect a hydraulic seal between adjacent stages.

3,647,639

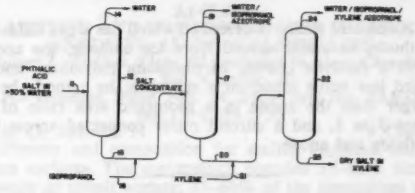
SALT DRYING BY PLURAL STAGE AZEOTROPIC DISTILLATION WITH PLURAL ENTRAINERS

Vernon W. Buls, Alamo, and F. Norman Grimsby, Orinda, Calif., assignors to Shell Oil Company, New York, N.Y.

Filed July 7, 1969, Ser. No. 839,556

Int. Cl. B01d *3/34*

U.S. Cl. 203—14 4 Claims



Water is removed from solutions of salts of phthalic acids by a three step process wherein water is removed by consecutive non-azeotropic distillation, azeotropic distillation with a low-boiling azeotroping agent, and azeotropic distillation with a higher-boiling azeotroping agent.

3,647,640

PROCESS FOR RECOVERING DIMETHYLFORMAMIDE BY DISTILLATION WITH DIMETHYLAMINE ADDITION

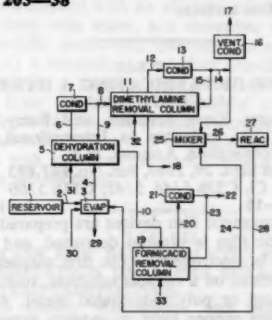
Hideo Matsuzawa, Hirotoshi Itoh, and Teruhiko Yoshioka, Hiroshima, Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan

Filed Mar. 31, 1970, Ser. No. 24,177

Claims priority, application Japan, Apr. 17, 1969, 44/29,933; May 31, 1969, 44/42,786

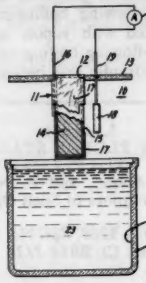
Int. Cl. B01d *3/34;* C07c *97/16*

U.S. Cl. 203—38 13 Claims



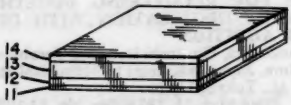
Dimethylformamide is recovered from the mixture containing formic acid by adding dimethylamine to the mixture and heating the mixture at a temperature between 90° C. and 180° C. to resynthesize dimethylformamide.

3,647,641
REACTANT SENSOR AND METHOD OF USING SAME
Willard T. Grubb, Schenectady, N.Y., and Robert A. Macur, Milwaukee, Wis., assignors to General Electric Company
Filed Oct. 26, 1970, Ser. No. 83,928
Int. Cl. G01n 27/46
U.S. Cl. 204—1 T 5 Claims



A reactant sensor is described which has a gas diffusion cathode, an anode spaced from the cathode, the anode with a catalytic coating of platinum, palladium, and a third less noble metal on a substrate the cathode being larger than the anode in a geometric area ratio of at least 3 to 1, and a current meter connected across the cathode and anode.

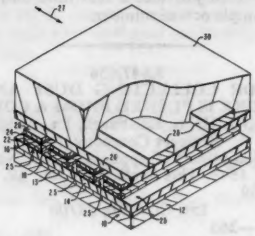
3,647,642
METHOD OF MAKING MIRROR-LIKE FINISHES ON METAL MASTERS
Roger A. Olson, Amery, Wis., assignor to Buckbee-Mears Company, St. Paul, Minn.
Filed July 8, 1969, Ser. No. 839,919
Int. Cl. C23b 7/00, 7/02; B01k 1/00
U.S. Cl. 204—11 7 Claims



A method for producing an optical or mirror-like finish on a metallic master by electroforming the metal master on a glass surface.

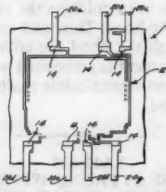
3,647,643
PROCESS OF FABRICATING A HYBRID MAGNETIC FILM
Gene S. Alberts, Essex Junction, and Barry L. Flur, Burlington, Vt., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Sept. 29, 1969, Ser. No. 861,883
Int. Cl. C23b 5/46, 5/48; G11b 5/00
U.S. Cl. 204—15 10 Claims

Multilayer magnetic film devices are prepared in which a first magnetic film is vacuum deposited, and a second magnetic film is electroplated. The first magnetic film is vacuum evaporated on a suitable substrate, such as silicon monoxide-coated or polyimide-coated metal. An electrically continuous copper layer is vacuum evaporated on the first magnetic film. An additional thickness of copper is electroplated on the electrically continuous copper layer. A second magnetic film is then electroplated on the additional thickness of copper. The layers so deposited may then be etched into an array of magnetic film devices in a single step etching process, using a suitable etchant for both the magnetic films and the copper, such as ferric chloride in the case of nickel-iron magnetic films. Single



step etching results in better definition, allowing substantially greater density of individual storage locations in a memory employing the magnetic film devices.

3,647,644
BEAM LEAD BONDING PROCESS
Edward J. Russell, Salt Lake City, Utah, assignor to General Instrument Corporation, Newark, N.J.
Filed Nov. 7, 1969, Ser. No. 874,829
Int. Cl. B01j 17/00; B29c 17/08; C23b 5/48
U.S. Cl. 204—15 23 Claims

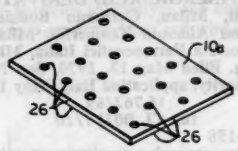


A method of forming a beam lead on a wafer of semiconductor material containing a plurality integrated circuits in which the beam lead is deposited on a layer of conductive material whereby it becomes physically bonded and electrically connected to the conductor pad of one of such integrated circuits and overlays said wafer outside said one circuit. Bonding to the conductive material outside said one circuit is inhibited by chemical treatment of such conductive material. Hence the wafer of semiconductor material may be divided readily into a plurality of chips each having beam leads attached thereto and extending therefrom in cantilever fashion. Also disclosed is a method of scribing the backside of said wafer remote from said beam leads such that the wafer may be broken into a plurality of chips along lines spanned by said beam leads. This is accomplished by directing infrared radiation through said wafer to establish a pattern indicating, on the backside of the wafer, the position of the beam leads or other circuit components located on the front side of the wafer.

3,647,645
METHOD FOR SELECTIVE ANODIZING OF PERFORATED PANELS
Gilberto Carrillo and William D. Brown, Riverside, Calif., assignors to Rohr Corporation, Chula Vista, Calif.
Filed Nov. 14, 1969, Ser. No. 876,863
Int. Cl. C23b 5/48; B44c 1/04
U.S. Cl. 204—15 8 Claims

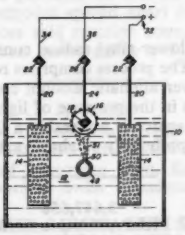
A method for anodizing only a selected side, edges and the interiors of perforations of a perforated panel, in which a pressure sensitive tape is applied to the selected side of the panel and over the perforations. A filler is placed in the perforations from the opposite side of the

panel over which a maskant is applied. The tape is then removed and the panel is tapped and rinsed to remove



the filler, after which the masked panel is anodized. The maskant is then removed from the panel.

3,647,646
METHOD AND APPARATUS FOR ELECTROPLATING CYLINDRICAL OBJECTS
William M. Tucker, Barrie M. Gardner, and John W. Hayford, Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Mar. 4, 1968, Ser. No. 710,035
Int. Cl. C23b *5/56, 5/68;* **B01k** *3/00*
U.S. Cl. 204—25 **26 Claims**



In electroplating a cylindrical object which serves as cathode in the plating process and is positioned adjacent to an anode immersed in the plating bath, the object is mounted in such manner that it is only partially submersed and the bath is agitated with sufficient force that the exposed surface of the object is maintained completely awash with the electrolyte solution. Defects in the plating resulting from occlusion of air bubbles or solid particles are thereby minimized and a high plating rate is attained.

3,647,647
PROCESS FOR PLATING TITANIUM
Jules P. Winfree, Jupiter, Fla., assignor to United Aircraft Corporation, East Hartford, Conn.
Filed Feb. 19, 1969, Ser. No. 800,549
Int. Cl. C23b *3/02, 5/08*
U.S. Cl. 204—32 R **6 Claims**

A process for forming a smooth adherent nickel plate on the titanium alloys utilizing a controlled half-wave anodic etch in a quiescent acid bath to achieve selective key-holing of the substrate surface, followed by cathodically applied nickel plating.

3,647,648
PLATING HIGH STRENGTH STEEL WITHOUT HYDROGEN EMBRITTLEMENT
Wilfred Dingley, Ottawa, Ontario, John S. Bednar, Gatineau Pointe, Quebec, and Raymond R. Rogers, Ottawa, Ontario, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Ontario, Canada
No Drawing. Filed May 18, 1967, Ser. No. 639,312
Int. Cl. C23b *1/00*
U.S. Cl. 204—34 **19 Claims**

A procedure is provided for the treatment of high strength steels so that they may later be electroplated in certain stable cyanide-zinc and stable cyanide-cadmium plating baths of precise composition. The procedure involves firstly cleaning away visible films from the steel surface, e.g. by using hydrochloric acid or sulfuric acid. The second step involves producing a thin fugitive porous metal film which is cathodic to the steel on the steel surface, e.g. by immersing the steel in a bath of copper sulphate to produce such a copper film. The third step involves removing the metal coating and simultaneously forming a smooth surface free of minute sharp edges, e.g. by treatment with an aqueous nitric acid-acetic acid cleaning solution or an aqueous nitric acid-acetic acid-phosphoric acid cleaning solution. The final step involves removing smut from the steel surface, e.g. by washing with water under hydraulic pressure, with added ultrasonic vibration or water under pneumatic pressure.

The procedure also includes using a stable cyanide-zinc bath whose composition satisfies the formula

$(OH^-$ normality$)-(CN^-$ normality$)=1.2$ and the ratio of CN^- normality/Zn^{++} normality ranges from 1.07 to 1.25; and the use of a stable cyanide-cadmium bath whose composition satisfies the formula

$(OH^-$ normality$)=(CN^-$ normality$)$ and the ratio of CN^- normality/Cd^{++} normality is about 2.8.

3,647,649
METHOD AND COMPOSITION FOR SEALING ANODIZED ALUMINUM SURFACES
Robert L. Treiber, Elgin, Ill., assignor to Alcor Chemical Co., Inc., Chicago, Ill.
No Drawing. Filed Feb. 24, 1970, Ser. No. 13,832
Int. Cl. C23b *5/50*
U.S. Cl. 204—35 N **9 Claims**

Process and composition for sealing anodized aluminum surfaces. The composition contains 35–60% nickel acetate or cobalt acetate; 35–60% of the ammonium salt of naphthalene sulfonic acid, and minor quantities of a condensation product of octyl phenol with ethylene oxide and malic acid. The composition is applied in hot aqueous solution to the aluminum surfaces to be sealed.

3,647,650
METHOD OF TREATING TIN PLATE OR GALVANIZED SHEET
Hidehisa Yamagishi, Yokohama-shi, Naoki Gunji, Tokyo, and Masao Takeuchi, Zushi-shi, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan
No Drawing. Continuation-in-part of application Ser. No. 755,803, Aug. 28, 1968. This application July 16, 1969, Ser. No. 842,337
Int. Cl. C23f *13/00*
U.S. Cl. 204—35 R **14 Claims**

A process for making tin plate or galvanized sheet which comprises subjecting the electrolytically plated sheet first to a post-treatment with an alkaline solution, then washing the sheet with water, and thereafter subjecting it to an electrolytic passivating treatment in a solution containing (a) a hexavalent chromium ions-furnishing compound and (b) a water-soluble saturated carboxylic acid selected from the group consisting of monobasic fatty acids, dibasic fatty acids, aromatic carboxylic acids, salts of such acids and mixtures of such acid or salts.

Sheets with improved resistance against corrosion and oxidation are obtained.

3,647,651
PROCESS FOR ELECTROLYTIC HYDRODIMERIZATION OF ALPHA,BETA-UNSATURATED COMPOUNDS
James B. Ganci, Wilmington, and Sebastian V. R. Mastrangelo, Hockessin, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.
No Drawing. Filed Aug. 31, 1970, Ser. No. 68,497
Int. Cl. C07b *29/06;* **C07c** *121/02, 121/26*
U.S. Cl. 204—73 A **4 Claims**

The process of electrolytic hydrodimerization of alpha, beta-olefinically unsaturated compounds in a conductive

aqueous medium consisting essentially of a hydrodimerizable alpha,beta-olefinically unsaturated compound dissolved in an aqueous, conductive salt solution wherein an alternating current is passed between electrodes at a frequency that will maintain a preselected pH range and minimize by-product formation.

3,647,652

STABILIZED PEPTONE SOLUTIONS AND PLATING BATHS CONTAINING THE SAME

Nicholas J. Spiliotis, Parsippany, N.J., assignor to Allied Chemical Corporation, New York, N.Y.

No Drawing. Filed Nov. 20, 1968, Ser. No. 777,477
Int. Cl. C23b *5/10, 5/14, 5/46*
U.S. Cl. 204—43 18 Claims

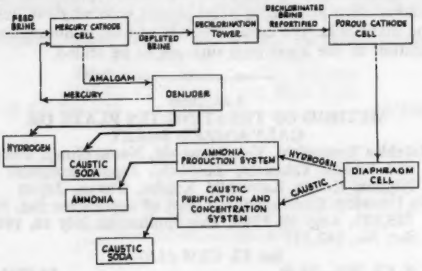
Invention relates to the stabilization of peptone solutions by the addition thereto of a stabilizing effective amount of an additive compound selected from carboxylic acids, esters of such acids, ketones, alcohols, aldehydes and the linear and cyclic polymers thereof and the use of such stabilized peptone solutions in the electrodeposition of metals from plating baths containing such stabilized peptone solutions.

3,647,653

PURIFICATION OF BRINE

Gordon A. Carlson, New Martinsville, W. Va., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 11, 1969, Ser. No. 806,204
Int. Cl. B01k *1/00;* C01d *1/08;* C22d *1/04*
U.S. Cl. 204—130 29 Claims



Disclosed is an electrolytic cell and a method for removal of mercury and other impurities from brine. The brine, having a low free chlorine content, is passed through a porous cathode and the impurities are electrolytically deposited on the cathode. The cathode is preferably regenerated by reversing the electrical potential and/or flushing with brine containing chlorine followed by flushing with hydrochloric acid solution.

3,647,654

BERYLLIUM-COPPER ELECTROPOLISHING SOLUTION

Emil Toledo, Natick, Mass., and Dennis R. Sprague, Tustin, Calif., assignors to Raytheon Company, Lexington, Mass.

No Drawing. Filed Oct. 15, 1969, Ser. No. 866,725
Int. Cl. C23b *1/00, 3/06*
U.S. Cl. 204—140.5 8 Claims

An aqueous electrolyte for leveling and polishing a beryllium-copper surface, said electrolyte comprising phosphoric acid, chromic acid, a maximum of 44 ml./liter of sulfuric acid, 12 to 22 ml./liter of fluoboric acid and a maximum of 22 ml./liter of hydrofluoric acid.

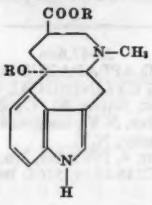
3,647,655

PROCESS FOR THE PREPARATION OF LUMILYSERGIC ACID DERIVATIVES

Luigi Bernardi, Milan, Germano Bosisio, Palazzolo Milanese, and Aldemio Temperilli, Milan, Italy, assignors to Societá Farmaceutici Italia, Milan, Italy

No Drawing. Filed May 12, 1970, Ser. No. 36,661
Claims priority, application Italy, May 13, 1969, 16,762/69
Int. Cl. B01j *1/10*
U.S. Cl. 204—158 7 Claims

A process for preparing lumilysergic acid derivatives of the formula



wherein R is a lower alkyl radical containing from 1 to 4 carbon atoms. The process comprises reacting the lysergic acid with a lower aliphatic alcohol containing from 1 to 4 carbon atoms in the presence of light and of a mineral acid. The light source is preferably a U.V. ray lamp. The mineral acid is preferably sulphuric acid.

3,647,656

METHOD OF PREPARING α SUBSTITUTED β, γ UNSATURATED LACTONES FROM ALKOXYFURANS

Rangaswamy Srinivasan and Hiroyuki Hiraoka, Ossining, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

No Drawing. Filed Apr. 9, 1969, Ser. No. 814,791
Int. Cl. B01j *1/10*
U.S. Cl. 204—158 8 Claims

Alpha substituted β, γ unsaturated lactones having the general formula

where R is an alkyl or aromatic group, is prepared. An alkyl or aromatic substituted alkoxyfuran is irradiated in the presence of actinic radiation either in the vapor phase or in solution.

3,647,657

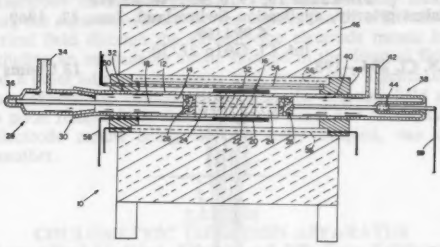
PROCESS FOR PRODUCING PROPYLENE

Richard N. Foster, 182 Beacon St., Boston, Mass. 02172

Filed Aug. 19, 1970, Ser. No. 65,214
Int. Cl. C07b *29/06;* C07c *5/18*
U.S. Cl. 204—168 7 Claims

In a process for producing propylene by dehydrogenation of propane wherein propane is introduced into a reactor having walls defining a chamber, a reaction zone within said chamber, an inlet to admit the propane to the chamber, an outlet to discharge propylene and hydrogen from the chamber, a structure of electrically nonconductive material supported in said reaction zone, said structure having channels for the passage of propane, hydrogen, and propylene, and a plurality of electrically conductive, catalytically active particles separately supported on said structure, said particles being electrically insulated one from another and having surface portions exposed to direct contact with said propane in said

channels, wherein the propane is heated to a temperature in the range 400° F. to 1200° F., and wherein the propane is then brought into contact with the surface portions of the particles to catalyze the dehydrogenation of the propane to form propylene, and wherein the propylene



is then withdrawn from the reactor, an improvement comprising applying, while said propane is in contact with said surface portions, an electric potential, difference between electrodes spaced apart one from another and opposed across said reaction zone, thereby causing said propane to react more rapidly to form propylene.

3,647,658

METHOD OF MAKING LACQUER COATINGS BY MEANS OF ELECTRO-PHORETIC DEPOSITION

Erich Hofling and Hanspeter Breu, Kreuzlingen, Switzerland, assignors to Swiss Aluminum, Ltd., Chipps, Switzerland

No Drawing. Filed Sept. 17, 1970, Ser. No. 73,186

Claims priority, application Switzerland, Sept. 18, 1969, 14,449/69

Int. Cl. B01k *5/02;* **C23b** *13/00*

U.S. Cl. 204—181 **6 Claims**

Method of covering a metal object with electro-phoretically deposited coatings having high dielectric strength wherein the previously electro-phoretically coated object after its burning-in the lacquer coating is exposed to a voltage stress in a liquid capable of conducting electrical current, the voltage is increased until the breakdown of the weak points of the coating takes place, and subsequently the object is electrophoretically lacquered again to cover the points of breakdown with a new lacquer layer without substantially changing the thickness of the previous coating.

3,647,659

PHOTOELECTROPHORETIC IMAGING PROCESS WHEREIN THE IMAGING ELECTRICAL FIELD IS APPLIED SUBSEQUENT TO IMAGEWISE EXPOSURE

Carol K. Keller, Rochester, Stephen F. Royka, Fairport, and Christopher Snelling, Penfield, N.Y., assignors to Xerox Corporation, Rochester, N.Y.

Filed Oct. 29, 1969, Ser. No. 872,174

Int. Cl. G03g *13/22;* **B01k** *5/00*

U.S. Cl. 204—181 **6 Claims**

A photoelectrophoretic imaging system wherein a suspension of electrically photosensitive particles in an insulating liquid migrate in image configuration when exposed to imagewise light and, subsequently, to electrical field. Separation of the exposing and field application steps is made possible by coating the suspension on an electrode using a biased coating member or by application of corona to the surface of the suspension just prior to the imagewise exposure step. Subsequent application of field then causes imagewise particle migration.

3,647,660

PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A HALOGEN CONTAINING SUSPENSION

John B. Wells, Rochester, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Filed Dec. 19, 1969, Ser. No. 886,534

Int. Cl. B01k *5/00;* **G03g** *13/00*

U.S. Cl. 204—181 **6 Claims**

This invention relates to a photoelectrophoretic imaging system whereby upon the addition of a halogen to the imaging suspension it is possible by regulating the polarities of the electrodes in the system to obtain both negative and positive images from a single sense input.

3,647,661

ELECTRODEPOSITION OF COATING LAYERS ON SUBTRATE STRUCTURES

Akira Matsushita, 99, 2-chome, Kosugigoten-cho, Kawasaki-shi, Japan

Filed Dec. 18, 1968, Ser. No. 784,552

Claims priority, application Japan, Dec. 23, 1967, 42/83,133

Int. Cl. B01k *5/00;* **C23b** *13/00*

U.S. Cl. 204—181 **12 Claims**

A current is passed through a cathode and an article adapted to function as an anode, the cathode and anode being disposed in an electrolytic vessel containing an emulsion prepared by dispersing fine particles of a filler in an aqueous solution having as its principal constituent an anionic, polyvalent polyelectrolyte consisting of a resin component, whereby a mixture of the fine particles and resin component is electrodeposited on the article. The coating layer is then dried to cause polycondensation of the resin component to form a film which functions directly as a binder between the fine particles.

3,647,662

TECHNIQUE FOR THE FABRICATION OF HAFNIUM NITRIDE RESISTOR

Dieter Gerstenberg, Allentown, Pa., and Frank Thomas John Smith, Bedford, Mass., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Original application Feb. 26, 1968, Ser. No. 708,159, now Patent No. 3,575,833, dated Apr. 20, 1971. Divided and this application June 1, 1970, Ser. No. 41,876

Int. Cl. C23c *15/00*

U.S. Cl. 204—192 **4 Claims**

A technique for fabricating hafnium nitride film resistors involves reactively sputtering hafnium in a nitrogen ambient upon a nonconducting substrate. Resistors fabricated in accordance with the described procedure manifest a wider range of available electrical properties such as temperature coefficient of resistance and resistivity than the widely used tantalum nitride devices.

3,647,663

METHOD OF FORMING A COMPOSITE INSULATING LAYER

James A. Cunningham, Dallas, and Clyde R. Fuller and Samuel J. Wood, Jr., Plano, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 19, 1968, Ser. No. 699,169

Int. Cl. C23c *15/00*

U.S. Cl. 204—192 **7 Claims**

Disclosed is a method of forming a composite insulating layer for use, primarily, in multilevel integrated circuits. An RF-sputtered silicon oxide layer is deposited

over the first layer contacts of a monocrystalline integrated circuit followed by the deposition of a layer of oxidative silicon oxide resulting from a reaction of silane SiH_4 with oxygen O_2 to form a composite insulating layer. The composite insulating layer combines the advantage of the silicon oxide layer formed by either method but with none of the disadvantages inherent in either.

3,647,664

METHOD OF MAKING A CURRENT CONTROLLING DEVICE INCLUDING A VO_2 FILM

Gordon R. Fleming, Pontiac, and Stanford R. Ovshinsky, Bloomfield Hills, Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Application May 27, 1969, Ser. No. 830,582, now Patent No. 3,588,639, dated June 28, 1971, which is a continuation-in-part of application Ser. No. 809,205, Mar. 21, 1969. Divided and this application Sept. 8, 1970, Ser. No. 70,156

Int. Cl. C23c *15/00*

U.S. Cl. 204—192 4 Claims

A current controlling device for an electrical circuit including a semiconductor element and electrodes in low electrical resistance contact therewith, wherein said semiconductor element has a threshold voltage value and a high electrical resistance to provide a blocking condition for substantially blocking current therethrough, wherein the high electrical resistance is substantially instantaneously decreased to a low resistance in response to a voltage above said threshold voltage value to provide a conducting condition for substantially conducting current therethrough, and wherein the semiconductor element between the electrodes comprises a thin substantially amorphous film of substantially VO_2 having high electrical resistance.

3,647,665

ELECTROCHEMICAL DEVICE FOR PRODUCING A RECORD

William W. Lester, Rockville, Md., assignor to Tracor, Inc., Austin, Tex.

Filed July 30, 1969, Ser. No. 845,968

Int. Cl. B01k *3/00;* H01v *7/00*

U.S. Cl. 204—194 7 Claims

An apparatus for producing a record in the nature of a photograph wherein small electrical currents are caused to pass through a silver halide emulsion of the type normally used in photographic printing paper. The invention is especially useful in producing a record of a pressure pattern such as an ultrasonic pattern in a fluid medium wherein one surface of a piezoelectric transducer is exposed to the pressure pattern, that surface being coated with a thin layer of an electrically conductive material. A planar array of semiconductor diodes is placed in a parallel contacting relationship with the other surface of the piezoelectric transducer to rectify the charge pattern resulting from stress in the transducer due to the pressures applied thereto. The rectified signals on the output side of the diode array are applied to a major face of a moistened layer of silver halide emulsion of a type normally used in photographic printing papers or films. The back of the emulsion sheet is coated with, or is in contact with, an electrically conductive sheet which is electrically connected to the conductive layer on the piezoelectric transducer. After exposure of the emulsion layer to currents generated by the piezoelectric crystal the emulsion is removed and processed in a conventional manner to develop the latent image produced therein by the electrical currents and thereby produce a record of the pressure patterns applied to the piezoelectric transducer. In the use of the apparatus described herein and in the method of producing the record, the emulsion is shielded from light of a kind which would produce an image.

3,647,666

MEASURING ELECTRODE FOR MEASURING OF IONS IN SOLUTIONS

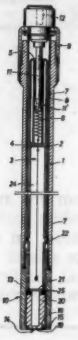
Wilhelm Simon, Oberembrach, Zurich, Willi Möller, Zurich, and René Dohner, Affoltern am Albis, Switzerland, assignors to Gebruder Moller, Glasblaserei Inhaber and Willi Moller, Zurich, Switzerland

Filed June 10, 1970, Ser. No. 45,191

Claims priority, application Switzerland, June 12, 1969, 8,994/69

Int. Cl. G01n *27/30*

U.S. Cl. 204—195 13 Claims



A measuring electrode for measuring ions in solution comprises an electrically insulating cylindrical casing which contains a glass or plastics cylinder having open top and bottom ends and a transverse partition wall, and a detachable electrode base carrying the ion selective member and closing the bottom end of said cylinder to form a hollow space within the cylinder between said partition wall and the electrode base adapted to contain the reference solution. An internal reference electrode is immersed in the solution and sealingly leads through said transverse partition wall and extends to the top of the casing where it is connected to junction means. Means are provided to enable an easy exchange of the electrode base of the reference solution and of the ion-selective material.

3,647,667

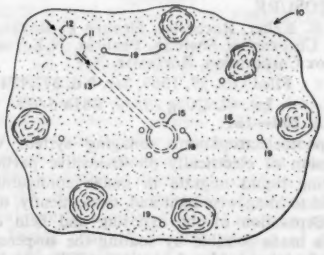
SEWAGE TREATMENT

Earl C. Peterson, 1300 Kelly Drive N., Minneapolis, Minn. 55427

Filed June 11, 1970, Ser. No. 45,319

Int. Cl. B01d *13/02;* B01k *5/00;* C02b *1/82*

U.S. Cl. 204—299 7 Claims



Means of dispersing aqueous effluents from a sewage treatment system utilizing a generally closed septic or

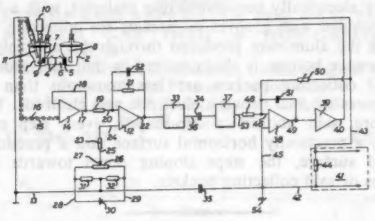
retention tank and a subterranean disposal field area. The septic tank is arrange to receive raw sewage and to retain solids and discharge aqueous fluid effluent therefrom. The disposal field is normally disposed adjacent the septic tank vessel and is arranged to receive and disperse the aqueous fluid effluent discharged from the septic tank. Electrode means are provided for electrolytically treating the aqueous effluent by the application of a DC electrical field through the effluent, the electrode means including an expendable anode situated in the disposal field at a point adjacent the septic tank vessel, and a generally non-expendable cathode situated in the disposal field at a point remote from the septic tank vessel and anode, the electrode means being electrolytically coupled, one to another.

3,647,668

COULOMETRIC TITRATION APPARATUS

Lars Alfred Lindblad, Klinten, and Nils Rune Kahlbom, Upplands-Vasby, Sweden, assignors to Jungner Instrument Aktiebolag, Stockholm, Sweden

Filed June 3, 1968, Ser. No. 734,172
Claims priority, application Sweden, June 6, 1967, 7,902/67
Int. Cl. G01n *27/44*
U.S. Cl. 204—195 **4 Claims**



A coulometric titration apparatus which has a Coulomb measuring device and an electrolytic titration device with a titration electrode system and a measuring electrode system is provided with an electronic apparatus which has a measuring section and a feeding section, said measuring section containing a difference amplifier connected to the measuring electrode system and having a voltage level changing device in one of the input channels thereto, and said feeding section being connected to the titration electrode system and provided with a current feedback path for obtaining rapid titration without oscillations.

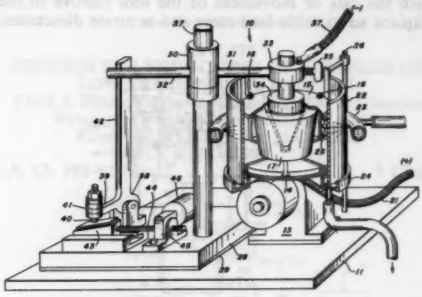
3,647,669

APPARATUS FOR FINISHING DIE NIBS

John W. Kelso, Dravosburg, Pa., assignor to United States Steel Corporation

Filed May 26, 1969, Ser. No. 827,609
Int. Cl. B23p *1/00*; C23b *5/68*
U.S. Cl. 204—212 **1 Claim**

A turntable has means for securing thereto a drawing die, the encased nib of which has an axial hole therethrough. A cylinder surrounding the die and extending upwardly from the table holds a slurry of abrasive particles in an electrolyte. A lapping tool is suspended eccentrically in the hole in the nib for contact with the surface defining the hole. The tool is mounted on a crank arm projecting from a sleeve journaled on a vertical shaft. A second arm extending from said sleeve is engaged by a bell crank to apply torque thereto. A cooling-spray pipe extends around the cylinder and an annular collecting trough is disposed below the lower edge of the latter. An



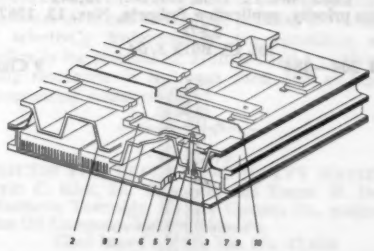
agitator supported from outside the cylinder projects thereinto.

3,647,670

COVER FOR ELECTROLYTIC CELL WITH MERCURY CATHODES AND ADJUSTABLE ANODES

Luciano Mosè and Gerhard Heuser, Dortmund, Germany, assignors to Friedrich Uhde GmbH, Dortmund, Germany

Filed May 14, 1969, Ser. No. 824,656
Claims priority, application Germany, May 17, 1968, P 17 71 392.7
Int. Cl. C22d *1/04, 1/02*
U.S. Cl. 204—219 **2 Claims**



A cover for a horizontal electrolytic cell having mercury cathode and adjustable anodes and in which the anodes have vertical current carrying shafts extending through the cover, the cover having downwardly projecting bulges at the passage points of the anode shafts, thereby effecting a saving in the material for the shafts and a gain in voltage because of the short current feed.

3,647,671

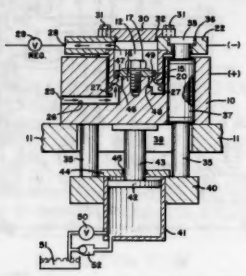
ELECTROCHEMICAL MACHINING APPARATUS

Ronald C. Abt, Cincinnati, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Mar. 24, 1969, Ser. No. 809,706
Int. Cl. B23p *1/04, 1/12*
U.S. Cl. 204—224 **8 Claims**

An electrochemical machining apparatus for machining to precise dimensions workpieces, such as gears, includes an electrolyte chamber in which is mounted the workpiece and an electrochemical machining tool. The tool is so positioned relative to the workpiece, and the chamber is so constructed, that electrolyte under pressure introduced into the chamber flows first over the tool and then between the tool and the workpiece. The hydrostatic

forces generated within the chamber by the electrolyte under pressure cause the tool to be moved into the workpiece. Control means outside the electrolyte chamber govern the rate of movement of the tool relative to the workpiece so variable feed rates and accurate dimension-



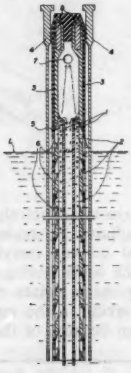
ing and repeatability of machining is obtained. The control means may include a constant flow hydraulic valve or a constant speed hydraulic or electric motor which allows, but which does not cause, a constant rate of movement between the tool and workpiece.

3,647,672

ELECTRODE WITH AEROLIFTING AND GAS-SEPARATION EFFECTS FOR ELECTROLYSIS OF SOLUTIONS OF ELECTROLYTES

Marin Russev Mehandjiev, Plovdiv, Bulgaria, assignor to Nautchno-Izsledovatelski Institut po Tzvetna Metalurgiya, Plovdiv, Bulgaria

Filed Nov. 12, 1968, Ser. No. 775,042
Claims priority, application Bulgaria, Nov. 13, 1967, 8,871
Int. Cl. B01k *3/04*
U.S. Cl. 204—284 **9 Claims**



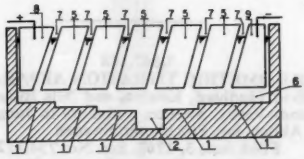
An electrode for electrolytic processes has a thin-walled hollow body with a pair of internal partitions of inert or nonconductive material defining with the electrode walls a pair of narrow air-lifting channels which communicate through inclined slots with the outer electrode surface; these partitions terminate within the electrode body above the electrolyte level but below the top of the electrode whereby gases evolving at the outer electrode surface, entering the channels through the inclined slots, rise in the channels and generate a circulation of electrolyte liquid which overflows the partitions and returns to the external electrolyte pool through a central compartment and the open bottom of the electrode.

3,647,673

STEPPED BOTTOM FOR MULTICELL FURNACE FOR PRODUCTION OF ALUMINUM BY ELECTROLYSIS

Giuseppe de Varda and Alberto Vajina de Pava, Milan, Italy, assignors to Montecatini Edison S.p.A., and Giuseppe de Varda, both of Milan, Italy, fractional part interest to each

Filed Mar. 24, 1969, Ser. No. 809,852
Claims priority, application Italy, Mar. 26, 1968, 14,381/68
Int. Cl. C22d *3/02, 3/12*
U.S. Cl. 204—244 **7 Claims**



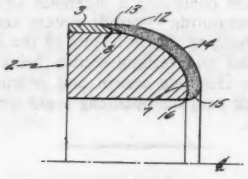
Described is a multicell furnace with bipolar suspended electrodes for the production of aluminum by means of thermal electrolysis of alumina dissolved in molten baths containing fluoro compounds, equipped with a vat of refractory electrically non-conducting material, with a bottom provided with grooves or pockets for collecting and tapping the aluminum produced through the electrolysis. The furnace bottom is characterized in that said grooves or said collecting pockets are less numerous than the interspaces or cells between electrode and electrode. Furthermore, said bottom is step-shaped, every step comprising a practically horizontal surface and a practically vertical surface, the steps sloping down towards said grooves or said collecting pockets.

3,647,674

ELECTRODE FOR SMALL HOLE ELECTRO-CHEMICAL DRILLING

Frederick R. Joslin, Lebanon, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed July 13, 1970, Ser. No. 54,496
Int. Cl. B01k *3/04;* C23b *5/74;* B23p *1/00*
U.S. Cl. 204—284 **10 Claims**



An electrode for electro-chemical drilling in which the dielectric on the outer surface of the tube is held in place at the working end of the electrode by an overlying metallic plating that covers the end surface of the tube.

3,647,675

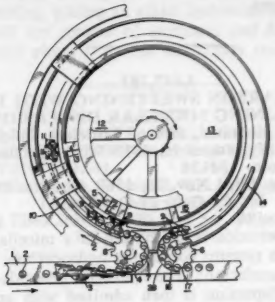
AUTOMATIC ROTARY ELECTRODEPOSITION APPARATUS

Edward J. Fiala, Oak Lawn, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Filed June 2, 1969, Ser. No. 829,412
Int. Cl. B01k *5/02;* C23b *13/00*
U.S. Cl. 204—300 **7 Claims**

An automatic electrodeposition machine which electrodeposits a coating onto a can body. The can body is passed

along a ring shaped trough which is filled with coating solution and an electric potential is applied between the solution and the can body to deposit a coating onto the



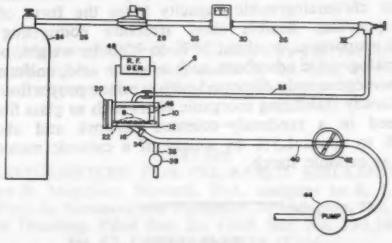
can body. The can body is dipped into the trough and is moved along in the trough a distance sufficient to allow the desired amount of coating to cover the inside and outside of the can body.

3,647,676

METHOD AND APPARATUS FOR REACTING IONIZED GAS WITH A NON-GASEOUS SUBSTANCE

Richard L. Bersin, Kensington, Calif., assignor to International Plasma Corporation

Filed Aug. 19, 1968, Ser. No. 753,683
Int. Cl. B01k *1/00*
U.S. Cl. 204—312 **4 Claims**



A method for ionizing gas and reacting it with a non-gaseous substance in which the gas is ionized by an electrical radio frequency (RF) field generated in the space surrounding the substance. The apparatus comprises a container defining a reaction chamber and a pair of electrodes coupled with an RF generator and placed closely adjacent an exterior surface of the container. The container includes an intake conduit and an exhaust conduit which is preferably diammetrically opposite the former. An access opening to the chamber is closed and sealed from the exterior of the container by a cover biased toward the portion of the container defining the opening.

3,647,677

RETARDATION OF COKE FORMATION

William F. Wolff, Park Forest, Ill., and Robert J. Rosscup, Valparaiso, and John A. Ridgway, Jr., La Porte, Ind., assignors to Standard Oil Company, Chicago, Ill.

No Drawing. Filed June 11, 1969, Ser. No. 832,427
Int. Cl. C07c *11/04;* **C10g** *9/16, 9/36*
U.S. Cl. 208—48 **6 Claims**

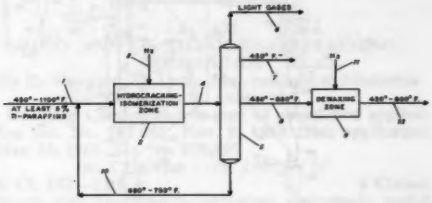
The formation of coke in high-temperature petroleum treatments is retarded by adding to the oil a coke-retarding amount of a coke retarder selected from the group consisting of elemental phosphorus and compounds thereof. Very small amounts of these coke retarders are effective, while they generally become ineffective above about 0.5%, based on the weight of the oil.

3,647,678

PROCESS FOR PRODUCING HIGH YIELDS OF LOW FREEZE POINT JET FUEL

Clark J. Egan, Piedmont, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 17, 1970, Ser. No. 20,238
Int. Cl. C10g *13/04, 37/02*
U.S. Cl. 208—59 **7 Claims**



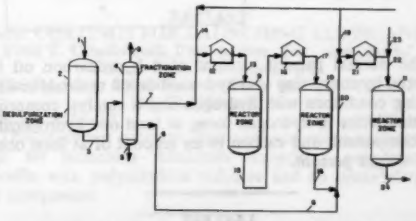
Process for obtaining a high yield of low freeze point jet fuel from a hydrocarbon feedstock containing materials boiling above the jet fuel boiling range and containing at least 5 volume percent normal paraffins which comprises subjecting said feedstock to hydrocracking and isomerization in the presence of hydrogen and a catalyst comprising a crystalline zeolitic molecular seive component substantially free of any catalytic metal or metals, a silica-containing gel component, a Group VI hydrogenating component and a Group VIII hydrogenating component, whereby the amount of jet fuel boiling range materials is increased and normal paraffins are isomerized, and selectively hydrocracking the remaining normal paraffins in the presence of hydrogen and a catalyst comprising mordenite in hydrogen form and at least one hydrogenating component.

3,647,679

PROCESS FOR REFORMING HEAVY NAPHTHA

Merritt C. Kirk, Jr., Thornton, and Ernest W. Dobson, Westtown Township, Chester County, Pa., assignors to Sun Oil Company, Philadelphia, Pa.

Filed June 25, 1970, Ser. No. 49,606
Int. Cl. C10g *39/00*
U.S. Cl. 208—63 **2 Claims**

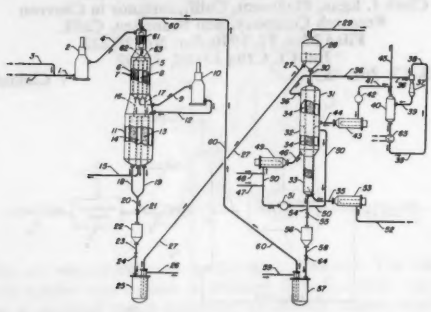


This invention relates to a process for reforming heavy naphtha wherein a naphtha feed boiling in the range of below about 390° F. is reformed in a series of reactors while a naphtha fraction boiling between about 390° to 415° F. is added to the feed into the last reactors of the series. The last reactors are provided with an excess of hydrogen. The invention provides an increased amount of reformate of increased octane. The invention also provides for the upgrading of a heavy naphtha fraction without excessive coke formation.

3,647,680
CONTINUOUS REFORMING-REGENERATION PROCESS

Arthur R. Greenwood, Niles, and Kenneth D. Vesely, Arlington Heights, Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Sept. 25, 1969, Ser. No. 860,905
Int. Cl. C10g 39/00
U.S. Cl. 208—65 22 Claims

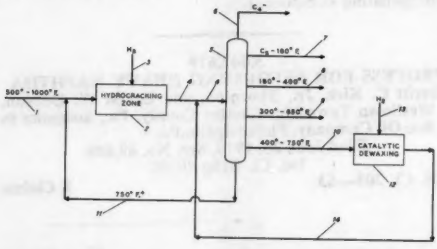


A method of operating a continuous reforming-regeneration process comprising one or more reforming reactors and employing a platinum catalyst wherein catalyst activity is maintained at a predetermined level by continuous regeneration thereof without the removal of any reactor from the process stream.

3,647,681
CATALYTIC DEWAXING

Clark J. Egan, Piedmont, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Sept. 9, 1969, Ser. No. 856,401
Int. Cl. B01j 11/40; C10g 13/02, 23/00
U.S. Cl. 208—111 14 Claims



The normal paraffin content of a hydrocarbon oil is reduced by contacting said hydrocarbon oil at catalytic dewaxing conditions with hydrogen and a catalyst comprising mordenite in hydrogen form, at least one hydrogenating component, and carbon in an amount of at least one-half weight percent.

3,647,682
OLEFIN PRODUCTION BY THE CATALYTIC TREATMENT OF HYDROCARBONS

Jule Anton Rabo, Armonk, Charles Leslie Angell, Pleasantville, and Gary William Skeels, Jr., Brewster, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

No Drawing. Filed Oct. 23, 1968, Ser. No. 770,084
Int. Cl. C10g 11/04; C01b 33/28; C07c 11/02
U.S. Cl. 208—120 5 Claims

Olefins are obtained in high yield by the catalytic cracking of petroleum feedstocks, particularly those rich in saturated hydrocarbons, using novel zeolitic molecular sieve catalysts which are fully cationized with monovalent and/or bivalent metal cations and which have less than three surface structural hydroxyls per hundred framework aluminum atoms.

3,647,683
HYDROCARBON SWEETENING WITH H_2O_2-CONTAINING MICELLAR DISPERSIONS

Joe T. Kelly, deceased, late of Littleton, Colo., by La Verne S. Kelly, executrix, 5713 Morning Glory Lane, Littleton, Colo. 80120

No Drawing. Filed Nov. 28, 1969, Ser. No. 880,959
Int. Cl. C10g 27/04, 27/08
U.S. Cl. 208—196 6 Claims

Hydrogen peroxide is solubilized in a micellar dispersion, i.e. stable systems containing hydrocarbon, aqueous medium, and surfactant. The hydrogen peroxide-containing micellar dispersion is then admixed with any liquid media in which hydrogen peroxide is to be used as a reactant or catalyst to effect intimate contact and dispersion of the hydrogen peroxide within the liquid media. In this manner sour hydrocarbon streams are sweetened, for instance.

3,647,684
ADDING CATIONIC MATERIAL TO SILICIC ACID SORBENT CHROMATOGRAPHIC SHEET FOR IMPROVED PERFORMANCE

Earl W. Malcolm, Bloomfield, Conn., assignor to The Dexter Corporation, Windsor Locks, Conn.

No Drawing. Filed Apr. 17, 1968, Ser. No. 721,951
Int. Cl. B01d 15/08; D21h 5/18
U.S. Cl. 210—31 12 Claims

A chromatographic medium exhibiting the high resolution of thin layer chromatography but substantially greater chromatographic capacity takes the form of a self-supporting, flexible sheet structure comprising a major proportion, or about 50% to 90% by weight, of a chromatographic adsorbent, such as silicic acid, uniformly and homogeneously dispersed with a minor proportion of structurally stabilizing inorganic fibers such as glass fibers disposed in a randomly oriented network and about 0.01% to about 1.5% by weight of a cationic material such as cationic starch.

3,647,685
PROCESS FOR DECOLORIZING DRY CLEANING SOLVENTS

Jameel Menashi, Lexington, and Paul F. Troiano, Norwood, Mass., assignors to Cabot Corporation, Boston, Mass.

No Drawing. Filed Feb. 25, 1970, Ser. No. 14,203
Int. Cl. B01d 15/00
U.S. Cl. 210—39 6 Claims

Dry cleaning solvents are decolorized by contact thereof with certain carbon blacks. An improved process for the decolorization of dry cleaning solvents with such blacks is described.

3,647,686
METHOD OF TREATING INDUSTRIAL WASTE WATER WITHOUT CONTAMINATION OF THE ENVIRONMENT

Karl Einar Gunnarsson, Torshalla, Sweden, assignor to Nyby Bruks Aktiebolag, Nyby bruk, Sweden

No Drawing. Filed Oct. 16, 1970, Ser. No. 81,577
Int. Cl. C02c 5/02
U.S. Cl. 210—48 7 Claims

The invention consists in a mode of treating industrial waste water contaminated with metal ions, nitrate ions

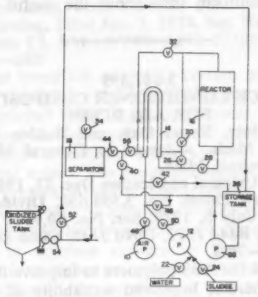
and fluoride ions which comprises the steps of converting the fluoride ions of the waste water to insoluble fluorides, neutralizing the waste water with an ammoniacal neutralizing agent and adding excess ammonia to a pH of at least 8, filtering, adding an alkali hydroxide to the filtrate, distilling off the content of ammonia and finally removing any solid phase from the distillation residue.

3,647,687

PROCESS OF CONDITIONING SEWAGE SLUDGE IN SYSTEM WITH BY-PASS VALVE SYSTEM FOR A SOLVENT WASH

Albert H. Matthiesen, Schofield, Wis., assignor to Sterling Drug Inc., New York, N.Y.

Filed July 2, 1970, Ser. No. 51,850
Int. Cl. C02c *1/40*
U.S. Cl. 210—63 8 Claims



A solvent washing system utilizing a by-pass for removing scale on the tubes and shells of the heat exchange parts of a system for treating sewage sludge.

3,647,688

DEEMULSIFIERS FOR OIL-BASED EMULSIONS

James S. Morrison, Newark, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

No Drawing. Filed Jan. 24, 1969, Ser. No. 793,908
Int. Cl. C09k *3/00*; B01d *17/04*
U.S. Cl. 252—8.55 C 3 Claims

Propylene oxide adducts of fatty alcohol phosphates having the average formula $R_n(PO_4)[(C_3H_6OH)_{1.5}]_{3-n}$, with up to about 0.5 milliequivalent of acidity per gram of adduct as $R_n(PO_4)(—H)_{3-n}$, where R is C_{8-30} alkyl and *n* is 1–2; and

Processes for resolving oil-brine and oil-hydrochloric acid emulsions by subjecting them to the action of these adducts.

3,647,689

MOLYBDENUM DISULPHIDE

Aleksander Jerzy Groszek, London, England, assignor to The British Petroleum Company Limited, London, England

No Drawing. Filed Sept. 24, 1969, Ser. No. 860,817
Claims priority, application Great Britain, Sept. 27, 1968, 45,973/68
Int. Cl. C10m *5/02*
U.S. Cl. 252—25 3 Claims

A process for the reduction of the corrosivity of oleophilic metal sulphides in which, either during or after grinding of a metal disulphide in an organic grinding liquid, the metal sulphide is contacted with organic bases especially organic amines.

3,647,690

CORROSION-INHIBITING COMPOSITIONS

Edward A. Cross, Beaumont, Tex., assignor to Texaco Inc., New York, N.Y.

No Drawing. Filed Mar. 25, 1969, Ser. No. 810,345
Int. Cl. C10m *5/22*
U.S. Cl. 252—33.3 5 Claims

This invention concerns oil-soluble corrosion inhibiting compositions comprising at least one anti-corrosive metal salt of naphthenic or aromatic type acids combined with at least one oil-soluble surfactant having an HLB value between 1 and 6. These compositions have substantially greater corrosion-inhibition properties than do the anti-corrosive salts themselves.

3,647,691

MONO- AND BIS-NITROGEN-CONTAINING COMPOUNDS

Billy D. Vineyard, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

No Drawing. Continuation-in-part of abandoned application Ser. No. 507,066, Nov. 9, 1965. This application Mar. 10, 1969, Ser. No. 805,897
Int. Cl. C10m *1/38, 1/36, 1/34*
U.S. Cl. 252—51.5 A 6 Claims

Mono- and bis-nitrogen-containing compounds useful as ashless detergents in lubricating oil compositions. The mono-compounds are prepared by reacting a long-chain ketone or aldehyde, a divalent nitrogen-containing compound, and a carbonyl-containing compound. The bis-compounds are prepared by reacting a long-chain ketone or aldehyde, a divalent nitrogen-containing compound, and a dicarboxylic acid or a dialdehyde or diketone.

3,647,692

NITROGEN-CONTAINING REACTION PRODUCTS AND THEIR USE IN LUBRICATING OILS AND FUELS

Richard J. Lee, Park Forest, Ill., assignor to Standard Oil Company, Chicago, Ill.

No Drawing. Filed Nov. 5, 1969, Ser. No. 874,396
Int. Cl. C10m *1/32*; C10l *1/18, 1/22*
U.S. Cl. 252—51.5 A 8 Claims

Oil-soluble compounds are prepared by heating a mixture comprising (a) a reduced nitro-nitrito alkane, containing at least ten carbon atoms, (b) an organic polybasic aliphatic or aromatic acid or anhydride, or long chain alkenyl substituted derivatives thereof, and (c) a polyalkylene amine, in the molar ratio of from about 1:1:0 to about 1:1:0.5, respectively; compounds so formed are useful additives in oleaginous compositions.

3,647,693

BASE COATINGS FOR LAUNCHING LUBRICANTS

Fred T. Crookshank, Port Arthur, Tex., assignor to Texaco Inc., New York, N.Y.

No Drawing. Filed Jan. 6, 1969, Ser. No. 789,407
Int. Cl. C10m *5/16*
U.S. Cl. 252—57 14 Claims

This invention concerns improved and novel base coatings for launching lubricants comprising petrolatum, paraffin wax, polyalkylene polymer and an optional tall oil component.

3,647,694

LUBRICATING OIL COMPOSITION

John W. Swanson, Yardley, Pa., and David A. Hartman and Russel L. Beers, Trenton, and Ernest J. Jamieson, Highland Park, N.J., assignors to Cities Service Oil Company, Tulsa, Okla.

No Drawing. Filed May 29, 1969, Ser. No. 829,142
Int. Cl. C10m *1/32*; C10l *1/22*
U.S. Cl. 252—51.5 A 7 Claims

An improved lubricating oil composition, particularly for use as a two-cycle engine oil, and the operation of a

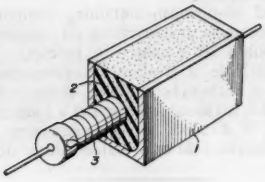
two-cycle engine therewith. The lubricating oil composition comprises a major proportion of a hydrocarbon lubricating oil and a minor proportion of an additive which acts as a dispersant in addition to enhancing the lubricity of the composition. The additives are organic compounds containing at least two amide linkages. A novel additive of this invention is obtained by condensing one mole of a dicarboxylic acid with two moles of a 1-(β-aminoethyl)-2-hydrocarbyl-2-imidazoline to form the corresponding diamide.

3,647,695

HEAT RESISTING INSULATING MATERIALS FOR ELECTRIC PARTS

Nobuo Hasegawa, Uji-shi, and Takahiro Kamo, Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma-shi, Osaka, Japan

Filed June 18, 1969, Ser. No. 834,455
Claims priority, application Japan, June 25, 1968, 43/44,720, 43/44,721
Int. Cl. F16l 59/00; H01b 3/10
U.S. Cl. 252—62 3 Claims



A heat resisting insulating inorganic material which consists of a phosphate, a siliceous sand and a plurality of metal oxides, and which is adapted for use, in the form of an aqueous slurry, in covering electric parts, such as resistors and heaters, by dipping, molding or coating, said slurry being hardened by a heat treatment at a temperature not higher than 400° C.

3,647,696

UNIFORM POLARITY RESIN ELECTROSTATIC TONERS

James R. Olson, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 736,552, June 13, 1968. This application Oct. 23, 1968, Ser. No. 770,122
Int. Cl. G03g 9/02
U.S. Cl. 252—62.1 10 Claims

A uniform polarity, particulate, dyed resin electrostatic toner is prepared by dissolving at least one mono- or difunctional organic acid nigrosine salt in a thermoplastic resin binder. Admixing the composite toner with a carrier such as powdered iron produces a developer for electrostatic latent images.

3,647,697

GROWTH OF CRACK-FREE BARIUM SODIUM NIOBATE AND RELATED MATERIALS

Albert A. Ballman, Woodbridge, and John R. Carruthers, Murray Hill, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill and Berkeley Heights, N.J.

Filed May 26, 1969, Ser. No. 827,702
Int. Cl. C04b 35/60; B01j 17/18
U.S. Cl. 252—62.9 8 Claims

A commercial technique for growth of optical grade material of the nominal composition $Ba_2NaNb_5O_{15}$ is described. The usually encountered cracking problem is minimized by following a critically slow cooling rate over a short temperature interval of from about 600° C. to about 400° C. Initial cooling from the crystallizing temperature to this interval and from this range to room temperature is not critical and may be rapid.

3,647,698

COMPOSITION FOR CLEANING ALUMINUM AND METHOD UTILIZING SAME

Kenneth P. Bellinger, Rockville, and Joseph F. Conoby, Somers, Conn., assignors to Conversion Chemical Corporation, Rockville, Conn.

No Drawing. Filed Nov. 5, 1969, Ser. No. 874,412
Int. Cl. C23f 3/02
U.S. Cl. 252—79.4 16 Claims

A composition for cleaning aluminum comprises an aqueous bath of urea nitrate and ferric sulfate. The bath is effective at ambient temperature to rapidly remove smut from aluminum alloy articles, and the rate of activity is substantially uniform throughout the useful life of the composition.

3,647,699

SURFACE CONDITIONER COMPOSITION FOR ABS RESIN

Warren R. Doty, Royal Oak, and Bobbie D. Knight, Tecumseh, Mich., assignors to General Motors Corporation, Detroit, Mich.

No Drawing. Original application Dec. 22, 1967, Ser. No. 692,702, now Patent No. 3,598,630. Divided and this application July 6, 1970, Ser. No. 60,981
Int. Cl. B44d 1/22; C09d 3/36; C08d 13/24
U.S. Cl. 252—79.2 2 Claims

A treatment for ABS polymers to improve the adhesion of coatings thereto. Improved wettability of the surface results from the oxidation of a portion of the available double bonds on the surface of the polymer. The polymer is treated in a solution containing from 50 to 80 percent by volume of U.S.P. grade orthophosphoric acid (05.3% H_3PO_4) and from 5 grams per liter to saturation of potassium permanganate.

3,647,700

K_2ZrF_6

Walt Phillips, Newark, N.J., assignor to Commodity Improvements Inc., New York, N.Y.

No Drawing. Filed Aug. 14, 1967, Ser. No. 660,894
Int. Cl. C11d 9/10
U.S. Cl. 252—89 2 Claims

Compositions containing and method of using K_2ZrF_6. The compositions described herein include detergents, toothpastes, deodorants, facial creams, hair products and storage battery fluids.

3,647,701

PROCESS FOR PREPARING A MIXTURE OF 4-METHYL-Δ-TETRAHYDROPHTHALIC ANHYDRIDES AS A CURING AGENT

Robert E. Robinson, Columbia, S.C., and Ronald L. De Hoff, Maplewood, N.J., assignors to R. T. Vanderbilt Company, Inc., New York, N.Y.

No Drawing. Filed Jan. 6, 1970, Ser. No. 1,049
Int. Cl. C07d 5/38; C08f 45/72
U.S. Cl. 252—182 8 Claims

The specification relates to a process for preparing liquid isomermized anhydride curing agent by reacting isoprene, butadiene, maleic anhydride or the like to provide an intermediate product which is subsequently rearranged in the presence of an organic sulfonic acid. The specification also relates to the curing agent prepared therefrom and its use in epoxy resins.

3,647,702
LIQUID EUTECTIC MIXTURES OF ORTHO-TOLYLENEDIAMINE, META-TOLYLENEDIAMINE AND BIS(AMINOPHENYL)METHANE
Louis F. Cole, Chicago, Ill., assignor to Union Carbide Corporation, New York, N.Y.
No Drawing. Continuation-in-part of application Ser. No. 628,263, Apr. 4, 1967, now Patent No. 3,546,169. This application Mar. 20, 1970, Ser. No. 21,482
Int. Cl. C08g *51/84*
U.S. Cl. 252—182 16 Claims

This application relates to liquid eutectic mixtures of ortho - tolylenediamine, meta - tolylenediamine and bis (aminophenyl) methane which are particularly useful as curing agents for polyepoxides.

3,647,703
SYNERGISTIC COMPOSITION AND ITS USE
Bernard F. Shema, Glenside, Robert H. Brink, Jr., Doylestown, and Paul Swered, Philadelphia, Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.
No Drawing. Filed Jan. 2, 1970, Ser. No. 443
Int. Cl. A01n *9/120;* A61k *23/00*
U.S. Cl. 252—180 12 Claims

The present invention relates to certain processes and compositions useful for inhibiting the growth of slime in water employed for industrial purposes, particularly water employed in the manufacture of pulp and paper, water employed in cooling water systems, as well as other industrial waters. The novel processes and compositions of the present invention are processes or mixtures which show unexpected synergistic activity against microorganisms, including bacteria, fungi and algae, which produce slimes in aqueous systems or bodies which are objectionable from either an operational or aesthetic point of view. Specifically, the invention is directed to the use of compositions comprising a combination of 3,5-dimethyltetrahydro-1,3,5-2H-thiadiazine-2-thione and a mixture comprising 2-nitro-2-ethyl-1,3-dimorpholino propane, and N-(2-nitrobutyl) morpholine.

3,647,704
PREMIXED ELASTOMERIC COMPOUNDING COMPOSITION AND PROCESS
William J. Schrantz, Jr., Louisville, Ky., assignor to International Rubber Industries, Inc., Louisville, Ky.
No Drawing. Filed Mar. 28, 1969, Ser. No. 817,171
Int. Cl. C08c *11/02;* C08d *13/28*
U.S. Cl. 252—182 11 Claims

A premixed elastomeric compounding composition having extended shelf-life and rapid cure characteristics and comprising, in synergistic combination, zinc oxide, sulfur, zinc oxide-fatty acid reaction product, and accelerators. The compounding composition is a mixture of granulated bound-together material of uniform composition which resists stratification into individual components.

3,647,705
SELF-EMULSIFIABLE PENETRANT COMPOSITION
Adolf Mlot-Fijalkowski, Elmwood Park, Ill., assignor to Magnaflux Corporation, Chicago, Ill.
No Drawing. Filed Sept. 15, 1969, Ser. No. 858,182
Int. Cl. G01n *13/00;* C09k *1/02*
U.S. Cl. 252—301.2 R 6 Claims

Self-emulsifiable penetrant composition particularly designed for use in the penetrant method for detecting surface discontinuities, the composition containing (1) at least one straight chain alcohol containing from 8 to 15 carbon atoms per molecule ethoxylated with from 3 to 12 mols of ethylene oxide per mol of alcohol, (2) a water immiscible fatty alcohol, (3) a vegetable oil, particularly castor oil, (4) an aliphatic hydrocarbon solvent, and (5) a dye.

3,647,706
PHOSPHOR AND METHOD OF MAKING
Costas Lagos, Danvers, Mass., assignor to Sylvania Electric Products Inc.
No Drawing. Filed May 6, 1968, Ser. No. 727,086
Int. Cl. C09k *1/36, 1/44*
U.S. Cl. 252—301.4 P 1 Claim

In a process of preparing a europium activated yttrium phosphate vanadate phosphor, yttrium oxide is blended with stoichiometric amounts of an ammonium phosphate compound and a vanadium compound. Europium oxide is then added to the blend and the blend is fired in air at a temperature between 1100° C. and 1400° C. After cooling, the blend is pulverized to a powder and the powder is washed in a dilute acid.

3,647,707
ALKALI MONOSULFIDE RECRYSTALLIZATION OF LANTHANIDE OXYSULFIDE LUMINESCENT MATERIAL
George R. Gillooly, Cleveland Heights, and Jacob G. Rabatin, Chardon, Ohio, assignors to General Electric Company
No Drawing. Filed Sept. 8, 1969, Ser. No. 856,153
Int. Cl. C09k *1/14*
U.S. Cl. 252—301.4 S 4 Claims

Y_2O_2S:Eu or related luminescent materials are recrystallized in liquid Na_2S or other alkali monosulfides to increase particle size and improve crystallinity and light production of the luminescent material. The starting material is preferably prepared by firing europium-containing Y_2O_3 or related oxides in H_2S gas.

3,647,708
LUMINESCENT MATERIAL
Willem Lambertus Wanmaker, Johannes Wilhelmus ter Vrugt and Johannes Guiljelmus Cornelis Maria de Bres, Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.
No Drawing. Filed July 23, 1970, Ser. No. 57,823
Claims priority, application Netherlands, July 29, 1969, 6911548
Int. Cl. C09k *1/44*
U.S. Cl. 252—301.6 R 3 Claims

A luminescent material activated by trivalent europium defined by the formula:

$$Me^{3+}{}_{(1-p-2/3q)}Eu_pMe_q^{2+}(VO_4)_{1-x-y}(RO_4)_x(BO_3)_y$$

in which Me^{3+} represents yttrium and/or gadolinium, Me^{2+} represents zinc and/or cadmium and R represents phosphorous and/or arsenic. Furthermore:

$$0.01 \leq p \leq 0.18$$
$$0.01 \leq q \leq 0.25$$
$$0 \leq x \leq 0.80$$
$$0.02 \leq y \leq 0.60$$
$$x+y \leq 0.90$$

3,647,709
PRODUCTION OF SILICA GELS
Thomas Hill, Falkirk, Scotland, assignor to BP Chemicals Limited, London, England
No Drawing. Filed Nov. 24, 1969, Ser. No. 879,526
Claims priority, application Great Britain, Nov. 25, 1968, 55,796/68
Int. Cl. B01j *13/00;* C01b *33/14*
U.S. Cl. 252—317 5 Claims

Silica gels from "densified" silica sols e.g. "Ludox" by process including a hydrothermal treatment at a tempera-

ture from 100° C. to 370° C. for from 12 to 200 hours at such a pressure that the water in the liquid phase does not evaporate.

3,647,710
METHOD FOR DISPERSING FOG WITH PHOSPHATE SALT COMPOSITIONS
Hugo Stange, Princeton, N.J., assignor to FMC Corporation, New York, N.Y.
No Drawing. Filed Feb. 10, 1970, Ser. No. 10,315
Int. Cl. B01d *17/00*
U.S. Cl. 252—319 5 Claims

A composition useful for dispersing fog consists essentially of a buffering hygroscopic phosphate containing from 1 to 2 cations of the group consisting of sodium, potassium and ammonium for each phosphorus, the phosphate particles being substantially all in a particle size range of above about 2 and under about 80 microns, the composition containing about 0.5 to 5% of a finely divided high-surface-area silica admixed therein.

3,647,711
USE OF CYCLIC AMIDINE POLYMERS AS OIL-IN-WATER DEMULSIFIERS
Robert R. Annand, St. Louis, and Derek Redmore, Ballwin, Mo., and Brian M. Rushton, Williamsville, N.Y., assignors to Petrolite Corporation, Wilmington, Del.
No Drawing. Original application Oct. 22, 1965, Ser. No. 502,636, now Patent No. 3,531,496, dated Sept. 29, 1970. Divided and this application May 18, 1970, Ser. No. 38,509
Int. Cl. B01d *17/04*
U.S. Cl. 252—344 10 Claims

The use of cyclic amidine polymers as oil-in-water demulsifiers. These polymers are formed (1) by reacting cyanohydrins with (2) cyclic amidine-forming polyamines to form polyaminonitriles; and by further reacting these polyaminonitriles intermolecularly or with a polyamine under cyclic amidine-forming conditions to form the polymers.

3,647,712
MIXTURE OF ALCOHOLS AND FLUORINATED BETA-DIKETONES USEFUL AS EXTRACTANT IN RECOVERY OF VANADIUM
Michael F. Lucid, Oklahoma City, Okla., assignor to Kerr-McGee Corporation, Oklahoma City, Okla.
No Drawing. Filed Sept. 4, 1970, Ser. No. 69,937
Int. Cl. B01f *1/00*
U.S. Cl. 252—364 4 Claims

A method for the extraction of vanadium from acidic solutions is provided which comprises extracting vanadium in the pentavalent state using a mixture of a fluorinated β-diketone and an alcohol in an organic solvent, the vanadium(V) being complexed with the extractant mixture and extracted into the organic phase.

3,647,713
NONAGGLOMERATING BLENDING PROCESS
Philip Morse, La Habra, Calif., assignor to Xerox Corporation, Rochester, N.Y.
No Drawing. Filed Feb. 10, 1969, Ser. No. 800,822
Int. Cl. B01f *3/18*
U.S. Cl. 252—408 16 Claims

This application relates to a process for uniformly blending a plurality of particulate materials wherein the finely divided materials are mixed with an inert carrier to form a slurry, blended for a period of time sufficient to achieve a homogenous mixture of materials throughout the slurry, and removing the carrier without adversely affecting the chemical activity of the mixture or disturbing the uniformity of blend.

3,647,714
CATALYST REGENERATION WITH TRANSFER LINE COMBUSTION AND DISPERSE PHASE DISCHARGE INTO A REGENERATOR
Frederick K. White, Allison Park, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.
Filed May 14, 1969, Ser. No. 824,598
Int. Cl. B01j *11/72, 11/04*
U.S. Cl. 252—417 6 Claims

When spent fluid cracking catalyst is at least partially regenerated by burning of carbon in the transfer line leading to the regenerator and the temperature in the regenerator chamber is at least 1220° F., regenerator residence times as low as 3 to 10 minutes provide carbon on regenerated catalyst levels as low as about 0.2 weight percent.

3,647,715
PROCESS FOR THE OXIDATION OF HYDROCARBONS
Derek Bryce-Smith, Sonning Common, and Stuart Samuel Adcock, Reading, England, assignors to Ethyl Corporation, New York, N.Y.
No Drawing. Original application Dec. 6, 1966, Ser. No. 599,382. Divided and this application Nov. 12, 1969, Ser. No. 871,281
Int. Cl. C07c *51/20*
U.S. Cl. 252—429 4 Claims

A catalyst system composed of a silver substance (e.g., $AgBF_4$) and a carboxylic acid anhydride (e.g., acetic anhydride) is suitable for use in the liquid phase oxidation of non-acetylenic hydrocarbons, particularly alkyl aromatics.

3,647,716
TRANSPORT REACTOR WITH A VENTURI TUBE CONNECTION TO A COMBUSTION CHAMBER FOR PRODUCING ACTIVATED CARBON
Charles F. Koches, Covington, Va., assignor to Westvaco Corporation, New York, N.Y.
Filed Apr. 3, 1970, Ser. No. 25,442
Int. Cl. C01b *31/08*; C10b *1/04*
U.S. Cl. 252—445 7 Claims

A continuous process and apparatus is described for producing a high yield activated carbon, or for regenerating a spent activated carbon. The activation process is carried out by introducing the raw material in a finely divided state into a fired reactor chamber where the raw material is subjected to a uniform heat transfer during its transport by the gaseous phase of the reactor chamber combustion products.

3,647,717
PROCESS FOR IMPROVING THE ACTIVITY OF ZEOLITIC CATALYST COMPOSITIONS
Anthony Peter Bolton, Valley Cottage, N.Y., assignor to Union Carbide Corporation, New York, N.Y.
No Drawing. Filed Aug. 26, 1970, Ser. No. 67,222
Int. Cl. B01j *11/40*
U.S. Cl. 252—455 Z 6 Claims

The catalytic activity of catalyst compositions comprising a zeolitic aluminosilicate in conjunction with a Group VIII noble metal oxide hydrogenation promoter are improved by converting the noble metal to its corresponding sulfide form, the sulfide to the corresponding hydroxide, the hydroxide to the corresponding noble metal ammine complex and thereafter decomposing the ammine complex in an oxidizing atmosphere followed by an activation by reduction in hydrogen.

3,647,718

MICROSPHERICAL ZEOLITIC MOLECULAR SIEVE COMPOSITE CATALYST AND PREPARATION THEREOF

Walter L. Haden, Jr., Metuchen, and Frank J. Dzierzanowski, Somerset, N.J., assignors to Engelhard Minerals & Chemicals Corporation, Township of Woodbridge, N.J.

No Drawing. Continuation-in-part of application Ser. No. 738,384, June 20, 1968. This application Mar. 25, 1969, Ser. No. 810,325

Int. Cl. B01j *11/40;* C01b *33/28*

U.S. Cl. 252—455 Z 8 Claims

A fluid zeolitic molecular sieve composite catalyst is prepared by reacting a mixture of two different forms of calcined kaolin clays in an aqueous alkaline reaction liquid, the two different forms of calcined kaolin clay being present in separate preformed microspheres which retain substantially their size and form throughout the reaction. Silica is extracted from the microspheres during reaction. The reacted microspheres are separated from the mother liquid and then they are ion exchanged.

3,647,719

DEHYDROGENATION METHOD AND CATALYTIC COMPOSITE FOR USE THEREIN

John C. Hayes, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

No Drawing. Filed Aug. 21, 1969, Ser. No. 852,104

Int. Cl. B01j *11/12*

U.S. Cl. 252—466 PT 10 Claims

Dehydrogenatable hydrocarbons are dehydrogenated by contacting them at dehydrogenatable conditions with a catalytic composite comprising a combination of catalytically effective amounts of a platinum group component, a germanium component, and an alkali or alkaline earth metal with a porous carrier material. A specific example of the catalytic composite disclosed herein is a combination of a platinum component, a germanium component, and an alkali or alkaline earth component with an alumina carrier material wherein the components are present in amounts sufficient to result in the composite containing, on an elemental basis, 0.01 to 2 wt. percent platinum, 0.01 to 5 wt. percent germanium, and 0.1 to 5 wt. percent of the alkali or alkaline earth metal.

3,647,720

METALS AND METAL COMPOUNDS

Derek Bryce-Smith, Highland Wood House, Mill Lane, Kidmore End, England, and Ernest T. Blues, 36 Reeds Ave., Earley, England

No Drawing. Filed Mar. 20, 1970, Ser. No. 21,529

Claims priority, application Great Britain, Mar. 21, 1969, 14,998/69; Mar. 27, 1969, 16,141/69

Int. Cl. B01j *11/08;* B22f *9/00*

U.S. Cl. 252—476 10 Claims

The invention relates to material containing a new form of silver referred to as cluster silver in which the atoms are arranged in a lattice different from the face-centred configuration of conventional silver, and in particular to silver metal, silver compounds, silver complexes and to a new compound silver ketenide, containing cluster silver, which material is characterized in possessing a magnetic susceptibility which is field dependent, such magnetic properties being developed in the cluster silver by thermal treatment or treatment with aqueous media or methanol. The invention also relates to the uses of such material, particularly its use as a catalyst in the oxidation of organic material, and its capacity to generate carbon suboxide.

3,647,721

POROUS STRUCTURE AND METHOD

Ival O. Salyer, Dayton, and Robert T. Jefferson, West Carrollton, Ohio, assignors to the United States of America as represented by the United States Atomic Energy Commission

Continuation-in-part of applications Ser. No. 586,923, Oct. 17, 1966, and Ser. No. 828,647, May 28, 1969. This application July 13, 1970, Ser. No. 54,298

Int. Cl. C08g *22/44;* B22f *9/00*

U.S. Cl. 260—2.5 AK 9 Claims

An open-pore polyurethane structure containing powdered metal comprising coherent spherical particles separated by interconnected interstices and a method of producing this structure comprising mixing metal powder with the components to make a polyurethane structure in a container, polymerizing the mixture in place without stirring after onset of gellation. The polyurethane can be removed preferably by heating in air at a temperature below the sintering temperature for the metal, and the remaining metal can then be sintered forming a sintered porous metal or metal oxide structure depending on the metal used and sintering conditions. A number of porous nickel products were made by the process of the invention and after the removal of the polyurethane depending on the particle size of the nickel and the amount and conditions of sintering densities of the products ranged from 1 to 5 g./cc., compressive strengths from 100 to 20,000 and porosity from 20 to 80%. The porous metals or sintered porous metals can be used in mechanical support, air and liquid filters, porous bearings, porous electrodes, acoustic filters, impact absorbers, capillary wicks, void fillers, integral conductor-insulator rods, and three-dimensional high-modulus reinforcements.

3,647,722

FRICTION ELEMENTS AND METHODS OF THEIR MANUFACTURE

Clarence E. Albertson, 240 S. Monterey, Villa Park, Ill. 60181, and Howard S. Okubo, 3318 N. Keystone, Chicago, Ill. 60641

Continuation-in-part of application Ser. No. 311,108, Sept. 24, 1963. This application Nov. 24, 1967, Ser. No. 689,237

Int. Cl. F16d *69/02;* C08g *37/08, 51/12*

U.S. Cl. 260—2.5 F 9 Claims

A method of manufacturing friction materials and/or elements by felting a slurry containing 70–100 percent asbestos fibers and 0–30 percent (based on dry ingredients) of a friction modifier such as barytes, cashew nut shell resin granules or other non-cellulosic fibers. A slurry is made by mixing the dry ingredients with phenolic, varnish-type resin dissolved in a suitable solvent. The amount of resin in the solution is adjusted to assure that the final material has a resin content of 15–35 percent. The solvent is evaporated from the felted material by drying and then the resin is set by heating at a higher temperature. Methods of forming coated friction elements are also described.

3,647,723

PROCESS FOR PREPARING EXPANDABLE VINYL AROMATIC POLYMERS

Stanislav Mysik and Jaromir Trneny, Kralupy nad Vltavou, Czechoslovakia, assignors to Kaucuk, narodni podnik, Kralupy, Czechoslovakia

No Drawing. Filed Sept. 12, 1969, Ser. No. 857,545

Claims priority, application Czechoslovakia, Sept. 20, 1968, 6,592/68

Int. Cl. C08j *1/26*

U.S. Cl. 260—2.5 B 10 Claims

Expandable vinyl aromatic polymers having reduced lumping and stickiness in the course of preexpansion are

prepared by polymerizing a vinyl aromatic monomer in an aqueous suspension in presence of a wax having a melting point from 70° C. to 120° C., acid number from 0 to 45, saponification number from 3 to 150. The polymerization temperature is raised above the melting point of the wax, but not exceeding 130° C. for 0.5 to 25 hours in presence of the wax.

3,647,724

URETHANE FOAMS WITH REDUCED SMOKE LEVELS

Herman P. Doerge, Verona, and Marco Wismer, Gibsonia, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

No Drawing. Filed Nov. 3, 1969, Ser. No. 873,639

Int. Cl. C08g *22/44, 41/00, 51/58*
U.S. Cl. 260—2.5 AJ 20 Claims

This invention relates to fire retardant polyurethane foams having reduced smoke levels. The invention comprises incorporating chlorendic acid into a fire-retardant foam formulation.

3,647,725

ROOM TEMPERATURE VULCANIZABLE SILICONE RUBBER STOCKS

Siegfried Nitzsche, Wolfgang Kaiser, Ernst Wohlfarth, and Paul Hittmair, Burghausen, Upper Bavaria, Germany, assignors to Wacker-Chemie G.m.b.H., Munich, Bavaria, Germany

No Drawing. Filed Feb. 24, 1970, Ser. No. 13,787

Claims priority, application Germany, Feb. 27, 1969, P 19 10 014.2

Int. Cl. C08h *9/00*
U.S. Cl. 260—18 S 11 Claims

Organosilicone room-temperature vulcanizing silicone rubber stocks are prepared by admixing α,ω-dihydroxydiorganopolysiloxanes with crosslinking agents of the formula $R_3SiO(R_2SiO)_nSiY_3$ where R is a hydrocarbon or substituted hydrocarbon radical, Y is a hydrolyzable group and n is 0 to 20.

3,647,726

FLUID POWDER COATING COMPOSITION

William W. Ulmer, Muskegon, Mich., assignor to Anaconda Wire and Cable Company, New York, N.Y.

No Drawing. Filed Jan. 2, 1969, Ser. No. 788,631

Int. Cl. C08g *30/12, 30/14, 45/04*
U.S. Cl. 260—18 EP 29 Claims

An epoxy fluid coating powder suitable for coating electrical conductors in a fluidized bed or an electrostatic fluid bed is prepared by mixing two solid diglycidyl ether bisphenol A resins of which the first has an epoxy equivalent weight of 825 to 1025 and a Durran's melting point of 93° to 105° C. and the second has an epoxy equivalent weight of about 1550 to 2500 and a Durran's melting point of 113° to 135° C. The resinous mixture contains about 80% to 90% weight of the first epoxy resin and a 10% to 20% by weight of the second epoxy resin. The resinous composition is mixed with 8 to 12.5 parts per 100 parts resins by weight (phr.) of trimellitic anhydride and about .11 to about .46 phr. of an activator, such as hexamethylene tetramine. The resultant coating from these powder mixtures has high flexibility, which is capable of passing a 180° edgewise bend with smoothness of the coating and has a thermoplastic flow of higher than 240° C. The resultant electrical conductor with a 2 mil coating can withstand more than 300 volts with less than 50 breaks per 100 feet.

3,647,727

METHOD FOR RENDERING A SYNTHETIC RESINOUS MATERIAL ANTISTATIC

Kimiaki Kabuki, Tokyo, and Bunjiro Murai, Yokohama-shi, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan

No Drawing. Filed Feb. 17, 1969, Ser. No. 800,003

Claims priority, application Japan, Feb. 24, 1968, 43/11,388

Int. Cl. C08g *31/18*
U.S. Cl. 260—18 4 Claims

An antistaticizing composition comprising (a) a polyhydric alcohol containing hydroxyl groups or a derivative thereof, (b) an organosilicon compound, and (c) an organometallic compound having one or more organic radicals bonded through an oxygen atom to a tin, boron, lead, phosphorus or antimony atom. From said composition, an antistatic agent, i.e., an organosilicon compound containing a polyoxyalkylene group bonded to a silicon atom through an oxygen atom, is formed upon heating in the process of conventional plastic molding operation.

3,647,728

PREPARATIONS OF POLYADDITION PRODUCTS, PROCESSES FOR THEIR MANUFACTURE AND USE

Alberto Deflorin, Riehen, Heinz Abel and Alfred Berger, Reinach, Basel-Land, Richard Casty, Kaiser-Augst, and Rosemarie Toepfl, Basel, Switzerland, assignors to Ciba Limited, Basel, Switzerland

No Drawing. Filed July 29, 1969, Ser. No. 845,881

Claims priority, application Switzerland, Aug. 8, 1968, 11,948/68

Int. Cl. C08g *41/04*
U.S. Cl. 260—18 8 Claims

Polyaddition products are prepared by reacting epoxides with basic polyamides in an equivalent ratio of 1:1 to 1:5. The polyamides are from polymeric unsaturated fatty acids and polyalkylene polyamines. The reaction is carried out in the presence of organic solvents at at most 80° C. No later than after completion of the reaction, it is ensured that a sample of the reaction mixture has a pH-value of 2 to 8 after dilution with water. The resulting polyaddition products are soluble or dispersible in water and are useful in the textile industry e.g. for rendering wool non-felting or for rendering textiles water repellent, when applied in combination with silicone oils.

3,647,729

INFRARED-ABSORBENT METHYL METHACRYLATE RESIN COMPOSITION AND SHAPED ARTICLES THEREOF

Haruo Nagai and Naohisa Sugiyama, Niigata-ken, Japan, assignors to Kyowa Gas Chemical Industry Co., Ltd., Tokyo, Japan

Filed Apr. 29, 1969, Ser. No. 820,064

Claims priority, application Japan, Apr. 10, 1967, 42/22,466, 42/51,264

Int. Cl. C08f *45/62*
U.S. Cl. 260—23 AR 20 Claims

A thermic ray-absorbent methyl methacrylate resin composition comprising a methyl methacrylate resin which

may contain not over 50% by weight of a copolymerizable monomer, said resin being incorporated with a nickel compound selected from the group consisting of organic acid salts of nickel and nickel complexes, in an amount of 0.07–5% by weight, calculated as nickel and shaped articles made therefrom.

3,647,730
MASKING COMPOSITIONS
Dennis A. Rott, Bethlehem, Pa., and John P. Smiljanic, Chicago, Ill., assignors to Western Electric Company, Incorporated, New York, N.Y.
No Drawing. Filed Aug. 27, 1969, Ser. No. 853,486
Int. Cl. B44d 1/52; C09d 3/44, 5/20
U.S. Cl. 260—23 R 8 Claims

Masking compositions for strip plating of metal stock and for anodizing of metallic surfaces are composed of high-melting microcrystalline wax and organophilic kaolinite blended with ethylene-vinyl acetate copolymer and pentaerythritol abietate. These compositions are flexible, tough and nonblocking, cool rapidly to solids, adhere well to metals, have good dielectric properties and can be cleanly removed from metal surfaces.

3,647,731
CONDENSATION PRODUCT OF OIL-SOLUBLE POLYMERS WITH POLYAMINE
Thomas J. Clough, Webster Groves, Mo., assignor to Sinclair Research, Inc., New York, N.Y.
No Drawing. Division of application Ser. No. 656,065, July 26, 1967, now Patent No. 3,483,125, which is a continuation-in-part of applications Ser. No. 440,949, Mar. 18, 1965, and Ser. No. 513,125, Dec. 10, 1965, which in turn is a continuation-in-part of application Ser. No. 446,410, Apr. 7, 1965. Divided and this application Apr. 28, 1969, Ser. No. 840,573
Int. Cl. C08f 37/18
U.S. Cl. 260—23.7 16 Claims

Extreme pressure additives for lubricating oils are prepared by Friedel-Crafts-catalyzed interpolymerization of a mono-1-alkene, an olefinically-unsaturated carboxylic acid (or ester thereof) wherein the olefinic bond is at least 2 carbon atoms away from the carboxyl group and, optionally, a conjugated diene hydrocarbon. Preferably, the mono-1-alkene is normal and has about 14 to 21 carbon atoms, the unsaturated acid has about 10 to 21 carbon atoms and, if the ester is used, is esterified with a lower alkanol, and the diene has 4 to 5 carbon atoms. Detergents for lubricating oils are prepared by condensation of these polymers with an essentially aliphatic polyamine having up to about 11 amino groups, at least one of which is primary, e.g., pentaethylene hexamine.

3,647,732
COATING COMPOSITION
Bob G. Gower, Park Forest, and Richard F. Poss, Flossmoor, Ill., assignors to Sinclair Research, Inc., New York, N.Y.
No Drawing. Continuation of abandoned application Ser. No. 717,934, Apr. 1, 1968. This application Nov. 17, 1970, Ser. No. 90,425
Int. Cl. C08f 45/52
U.S. Cl. 260—28.5 11 Claims

A coating composition that contains up to about 90 weight percent of a polymeric film former, up to about 50 weight percent of a hydrocarbon wax, about 5 to 90 weight percent of a carboxyl group-containing leveling resin and about 0.2 to 40 weight percent of a leveling aid, gloss-improving lactam is disclosed. Additionally, about 0.05 to 0.4 weight percent of a carboxyl group-reactive, complexing metal is disclosed for the embodiment of detergent-resistant waxes.

3,647,733
AQUEOUS DISPERSION OF ETHYLENE/VINYL ALKANOATE COPOLYMER AND WAX CONTAINING NEOPRENE
John William McDonald, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
No Drawing. Continuation-in-part of application Ser. No. 743,335, July 9, 1968. This application Jan. 11, 1971, Ser. No. 105,705
Int. Cl. C08f 45/24, 45/52
U.S. Cl. 260—28.5 AV 8 Claims

A coating based on an ethylene/vinyl alkanoate copolymer and wax and formed from an ethylene/vinyl alkanoate copolymer and wax dispersion has increased coating adhesion to substrates at high-humidity or water-soaked conditions when neoprene is added thereto.

3,647,734
PREPARATION OF FLAME RETARDANT COMPOSITION FOR CELLULOSIC MATERIAL
James E. Hardwicke, Columbia, and Bernard Scheffler and Herman S. Weisz, Rock Hill, S.C., assignors to M. Lowenstein & Sons, Inc., New York, N.Y.
No Drawing. Filed Mar. 26, 1970, Ser. No. 23,079
Int. Cl. C08g 51/24, 37/32
U.S. Cl. 260—29.4 R 5 Claims

A composition for rendering cellulosic material flame retardant is prepared by maintaining the intermediate reaction product 3-(di-isopropylphosphono) proprionamide in aqueous solution below its melting point for methylolation with formaldehyde to form the N-hydroxymethyl derivative, and then formulating this derivative with an aqueous methyolmelamine resin solution and an acid catalyst for pad-dry-cure application to the cellulosic material. Cellulosic material treated with the resulting composition is rendered self-extinguishing and retains this characteristic after fifty washings.

3,647,735
PIGMENTED FINISHES FOR FIBROUS ARTICLES
John G. Brodnyan, Langhorne, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.
No Drawing. Filed Jan. 29, 1970, Ser. No. 6,919
Int. Cl. C08f 39/00
U.S. Cl. 260—29.4 UA 3 Claims

The present invention concerns pigment-finishing, i.e. pigment-dyeing or pigment-printing of fibrous materials, such as textile fabrics of all kinds including those formed of siliceous fibers. The pigment-binding composition of the present invention comprises a mixture of a relatively soft linear addition polymer and a relatively hard addition polymer. The pigmented finishes show improved crockfastness and abrasion-resistance.

3,647,736
HYDROPHILIC CONTACT LENS MATERIAL
David G. Ewell, Richmond, Calif., assignor to Kontur Kontact Lens Company, Inc., Richmond, Calif.
No Drawing. Filed May 25, 1970, Ser. No. 40,456
Int. Cl. C08f 19/00, 33/04; G02c 7/04
U.S. Cl. 260—29.6 WB 5 Claims

A hydrogel of a hydrophilic polymer formed from a major proportion of a hydroxyalkyl methacrylate and a minor portion of a polyalkene lactam, its preparation and use as a soft corneal contact lens.

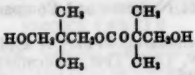
3,647,737

NOVEL MIXTURES OF ACRYLIC MONOMERS AND THE PREPARATION THEREOF

Rostyslaw Dowbenko and Roger M. Christenson, Gibsonia, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

No Drawing. Filed May 26, 1969, Ser. No. 827,974
Int. Cl. C08f 3/64, 15/16
U.S. Cl. 260—31.6 22 Claims

Novel acrylic monomers and mixtures of acrylic monomers are prepared by reacting a diol such as



with an acrylic or methacrylic acid or their anhydrides or acid chlorides and a monofunctional aliphatic, alicyclic or aromatic acid. The reaction product is a mixture of monomers which may be copolymerized as such by subjecting it to ionizing irradiation, actinic light, or to free-radical catalysts and the resulting copolymer is a hard, mar-resistant and relatively flexible material, or the mixture may be separated into individual components which can be polymerized separately.

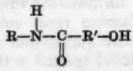
3,647,738

α-OLEFIN POLYMER COMPOSITIONS

George N. Foster, Somerville, N.J., assignor to Union Carbide Corporation, New York, N.Y.

No Drawing. Filed Nov. 3, 1970, Ser. No. 86,613
Int. Cl. C08k 1/44
U.S. Cl. 260—32.6 13 Claims

α-Olefin polymer compositions characterized by affording films having a low coefficient of friction, a low blocking force, and no blooming have been developed by incorporating therein about 0.01 to 5.0% by weight of an amide having the formula:



wherein R is an alkenyl radical having 18 to about 22 carbon atoms and R′ is a divalent hydrocarbon radical containing 3 to 15 carbon atoms.

3,647,739

STABILIZED CONJUGATED DIENE RUBBER POLYMERS

Edward Leo Kay, Akron, and Jerry Donald Hunt, Cuyahoga Falls, Ohio, and Robert Paul Spitz, West Lafayette, Ind., assignors to The Firestone Tire & Rubber Company, Akron, Ohio

No Drawing. Filed June 4, 1970, Ser. No. 43,573
Int. Cl. C08d 9/00, 11/04
U.S. Cl. 260—33.6 UA 5 Claims

Unvulcanized rubbery interconnected polymers are stabilized with a tetra-aryl titanate or a complex thereof with N-alkyl-alkanediamines.

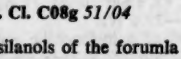
3,647,740

FLUOROCARBON SILICONE COMPOSITIONS

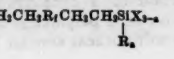
Lorne A. Loree, Ogden R. Pierce, and Yung Ki Kim, Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

No Drawing. Continuation-in-part of application Ser. No. 749,577, Aug. 2, 1968. This application June 23, 1970, Ser. No. 57,022
Int. Cl. C08g 51/04
U.S. Cl. 260—37 SB 25 Claims

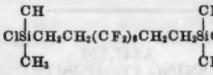
Organosilanes and silanols of the forumla



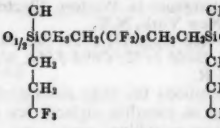
and siloxanes of the formula



are disclosed. Examples of such compounds include



and



Certain polymers are particularly useful for making reversion resistant siloxane rubbers and resins.

3,647,741

STABILIZED HEAT CURABLE SILICONE ELASTOMERS

William Earl Hutchinson, Erie, Pa., assignor to Stauffer-Wacker Silicone Corporation

No Drawing. Filed Dec. 18, 1968, Ser. No. 784,902
Int. Cl. C08g 51/04
U.S. Cl. 260—37 7 Claims

Silicone elastomers having improved heat stability, compression set and resistance to reversion may be obtained by incorporating fumed titanium dioxide in heat curable organopolysiloxane compositions.

3,647,742

TREATMENT OF ALUMINA FILLERS WITH SILANE COUPLING AGENTS FOR EPOXY RESINS

John J. Stevens, Jr., Highland Park, N.J., assignor to Union Carbide Corporation, New York, N.Y.

No Drawing. Filed Nov. 7, 1969, Ser. No. 874,972
Int. Cl. C08g 51/04
U.S. Cl. 260—37 EP 21 Claims

Organo-functional silane coupling agents are employed to treat hydrated alumina incorporated filler in cycloaliphatic epoxy resin compositions.

3,647,743

GLASS FIBRE REINFORCED POLYACETAL RESIN COMPOSITION

Kazuo Nagamatsu, Tokyo, Masatsugu Yoshino and Tsugio Konno, Irumagun, and Shinichi Ishida, Tokyo, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Osaka Prefecture, Japan

No Drawing. Filed Dec. 17, 1969, Ser. No. 885,987
Claims priority, application Japan, Dec. 24, 1968, 43/94,170
Int. Cl. C08g 51/10
U.S. Cl. 260—37 AL 6 Claims

This invention discloses a glass fibre reinforced polyacetal resin composition comprising 5 to 65% by weight, based on the weight of the composition, of glass fibres coated with styrene-type polymer, and a polyacetal resin. The glass fibre reinforced polyacetal resin composition of this invention is produced by mixing glass fibres with a polyacetal resin after a styrene-type resin is coated on and adhered to the surface of the glass fibres. Thus, not only the impact strength but also other properties such as heat distortion temperature, mold shrinkage, hue and heat resistance can be greatly improved. Moreover, not

so much gas is evolved on melting and heating the glass fibre reinforced polyacetal resin of this invention as compared with conventional ones.

3,647,744
FRICTION MATERIAL ADDITIVES FOR IMPROVED PERFORMANCE
James L. Rich, Allen Park, and Marvin H. Weintraub, Oak Park, Mich., assignors to Ford Motor Company, Dearborn, Mich.
Filed Jan. 22, 1970, Ser. No. 5,060
Int. Cl. C08k *1/18*
U.S. Cl. 260—38 **2 Claims**

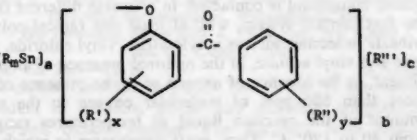
This invention teaches that conventional automotive brake linings which are basically compounded from asbestos and a synthetic thermosetting resin can be greatly improved by the addition of a small amount of any of the alkali metal fluorides and especially by the addition of sodium fluoride.

3,647,745
SEALING COMPOSITIONS CONTAINING PHOSPHORUS- AND METAL-CONTAINING ANTISAG AGENTS
Thomas Charles Jennings, Lyndhurst, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio
No Drawing. Continuation-in-part of application Ser. No. 739,956, May 8, 1968, which is a division of application Ser. No. 565,740, July 18, 1966, now Patent No. 3,470,222, which in turn is a continuation-in-part of application Ser. No. 493,240, Oct. 5, 1965. This application Apr. 20, 1970, Ser. No. 30,305
Int. Cl. C08f *45/62*
U.S. Cl. 260—41 R **5 Claims**

Phosphorus- and metal-containing compositions, prepared by reacting phosphoric acid with an organic epoxide and further reacting the intermediate thus formed with a metal base (especially zinc oxide), are useful as antisag agents in sealing compositions.

3,647,746
LIGHT-STABILIZED POLYMERS
Toshio Seki, Osaka, Kozaburo Suzuki, Kobe, and Takashi Matsuzaki, Osaka, Japan, assignors to Nitto Kasei Co., Ltd., Osaka, Japan
No Drawing. Continuation-in-part of application Ser. No. 851,519, June 24, 1969, which is a division of application Ser. No. 646,465, June 16, 1967, which in turn is a continuation-in-part of application Ser. No. 567,823, July 26, 1966, now Patent No. 3,498,947. This application June 15, 1970, Ser. No. 46,479
Claims priority, application Japan, July 26, 1965, 40/44,846
The portion of the term of the patent subsequent to Mar. 3, 1987, has been disclaimed
Int. Cl. C08f *45/62*
U.S. Cl. 260—45.75 K **12 Claims**

Organotin compounds of the formula



prepared by the reaction of an aromatic hydroxy carbonyl compound and an organotin oxide or alkoxide may be used as stabilizers for synthetic resins.

3,647,747
HIGH TEMPERATURE MOLDING FLAME RETARDANT POLYCARBONATE COMPOSITION
Charles A. Bialous, Mount Vernon, Ind., assignor to General Electric Company
No Drawing. Filed Apr. 15, 1970, Ser. No. 28,952
Int. Cl. C08g *39/10, 51/56*
U.S. Cl. 260—45.75 R **6 Claims**

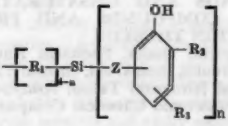
A high temperature molding polycarbonate composition having in admixture an aromatic polycarbonate and 0.05 to about 2.0 weight percent of an alkaline earth carbonate based on the weight of the polycarbonate composition. Preferably, the alkaline earth carbonate is barium carbonate.

3,647,748
STABILIZED VINYL HALIDE RESIN COMPOSITIONS
John W. Brook, Plainfield, N.J., and Samuel Hoch, Brooklyn, N.Y., assignors to Tenneco Chemicals, Inc.
No Drawing. Filed Feb. 19, 1969, Ser. No. 800,750
Int. Cl. C08f *45/58, 45/62*
U.S. Cl. 260—45.75 **23 Claims**

Vinyl halide resin compositions that contain a stabilizer system comprising an organotin carboxylate, an organic disulfide or polysulfide, and, optionally, a small amount of thiodipropionic acid, and thiodipropionate ester, and/or an organic phosphite have excellent processing characteristics, excellent heat and light stability, and other valuable properties.

3,647,749
ANTIOXIDANT COMPOSITION FOR ORGANIC MATERIALS
Edward F. Zaweski, Pleasant Ridge, and Bernard R. Meltsner, Royal Oak, Mich., assignors to Ethyl Corporation, New York, N.Y.
No Drawing. Original application July 28, 1966, Ser. No. 568,390, now Patent No. 3,491,137, dated Jan. 20, 1970. Divided and this application Sept. 26, 1969, Ser. No. 861,458
Int. Cl. C08d *11/04*; C08f *45/60*; C08g *51/60*
U.S. Cl. 260—45.85 **12 Claims**

Organic material such as polypropylene is stabilized by addition of dihydrocarbyl-hydroxyphenoxy hydrocarbyl silanes having the formula:



wherein R_1 and R_2 are hydrocarbon radicals, Z is oxygen, sulfur or the imino group, and R_3 is a hydrocarbon radical, an alkoxy radical or a halogen. A typical example is diphenyl bis(3,5 - di-tert-butyl-4-hydroxyphenoxy)silane. Effectiveness is improved by including a dihydrocarbylthiodialkanoate such as dilaurylthiodipropionate, or a phosphonate such as tri-p-nonylphenylphosphite.

3,647,750
PREPARATION OF HYDROXYALKYL ESTERS OF AROMATIC ACIDS
Marvin A. McCall, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.
No Drawing. Filed Oct. 13, 1969, Ser. No. 866,039
Int. Cl. C07c *69/78, 69/82*
U.S. Cl. 260—475 P **17 Claims**

In the preparation of 2-hydroxyalkyl esters of aromatic mono- or dicarboxylic acids by reaction of aromatic

mono- or dicarboxylic acid with an alkylene oxide of 2 to 8 carbon atoms, the improvement which comprises conducting the reaction in hexamethylphosphoric triamide as a reaction medium.

3,647,751
POLYARYLETHER-SULPHONES
Gerhard Darsow, Krefeld-Uerdingen, Germany, assignor to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany
No Drawing. Filed May 19, 1970, Ser. No. 38,870
Claims priority, application Germany, June 25, 1969, P 19 32 067.3
Int. Cl. C08g *23/24*
U.S. Cl. 260—49 7 Claims

New polyaryl ether sulphones are provided which are valuable thermoplastic resins and which are the reaction products of molar amounts of dihalo-diphenyl-disulphonearyls and of alkali metal bis-phenolates.

3,647,752
TREATMENT OF POLYPHENYL THIOETHERS
Carl W. Gieseking, St. Louis, and James D. Sullivan, Webster Groves, Mo., assignors to Monsanto Company, St. Louis, Mo.
No Drawing. Filed Nov. 27, 1968, Ser. No. 779,638
Int. Cl. C07c *149/30*
U.S. Cl. 260—609 E 8 Claims

The oxidative stability of polyphenyl thioethers is increased and their corrosiveness towards metals is decreased by contacting the polyphenyl thioethers under basic conditions in the liquid phase with an oxidizing agent which maintains its oxidation functionality under basic conditions. For example, m-bis(phenylmercapto) benzene is contacted with a basic aqueous solution of sodium hypochlorite at 100° C. for 8 hours to improve its oxidative stability.

3,647,753
ALTERNATING COPOLYMERS OF CONJUGATED COMPOUNDS AND UNSATURATED HYDROCARBON COMPOUNDS AND PROCESS FOR PRODUCTION THEREOF
Kohei Nakaguchi, Osaka, Shohachi Kawasumi, Kobe, Masaaki Hirooka, Ibaraki-shi, Hiroshi Yabuuchi, Takatsuki-shi, and Hiroyoshi Takao, Ashiya-shi, Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan
No Drawing. Continuation of abandoned application Ser. No. 565,726, July 18, 1966. This application Oct. 15, 1969, Ser. No. 866,775
Claims priority, application Japan, July 22, 1965, 40/44,060; July 30, 1965, 40/46,495; July 2, 1966, 41/35,764
Int. Cl. C08f *3/40, 3/74, 9/00*
U.S. Cl. 260—63 R 13 Claims

A compound having a C≡N or C=O group in the conjugated position relative to the C=C bond forms a complex with an organohalide of aluminum or boron. An alternating copolymer is obtained from a monomer satisfying said requirement and inner olefinic monomers or polymers or acetylenes having a donor property. In this case, an organoaluminum halide or an organoboron halide is suitable as the catalyst for said copolymerization. This type of active species can also be obtained by mixing an organic compound of a metal of Group II, III or IV of the Periodic Table with a halide of a metal of Group III or IV in the presence of the above-mentioned conjugated monomer.

3,647,754
PREPARATION OF MACROMOLECULAR FORMALDEHYDE POLYMERS
Jentje Bonnema, Beek, and Emanuel M. J. Pijpers, Elsloo, Netherlands, assignors to Stamicarbon N.V., Heerlen, Netherlands
No Drawing. Continuation-in-part of application Ser. No. 509,606, Nov. 24, 1965. This application Mar. 27, 1970, Ser. No. 23,488
Int. Cl. C08g *1/02, 1/12*
U.S. Cl. 260—67 15 Claims

A process for the preparation of macromolecular formaldehyde polymers is described wherein formaldehyde containing substantial amounts of water, e.g., from 0.5% up to 7% or even more, may be polymerized. The catalysts used for this process are certain titanium compounds dissolved in an inert liquid medium, such as titanic esters of alcohols, cyclo alcohols, phenols and thiophenols; titanium salts of organic salts and other organic titanium compounds.

3,647,755
PROCESS FOR THE PREPARATION OF ETHERIFIED MELAMINE RESINS
Arnold Giller, Wehen, Taunus, Germany, assignor to Chemische Werke Albert, Weisbaden-Biebrich, Germany
No Drawing. Continuation of application Ser. No. 724,294, Apr. 25, 1968. This application June 26, 1970, Ser. No. 56,069
Claims priority, application Germany, Apr. 28, 1967, C 42,180; Jan. 20, 1968, C 44,436
Int. Cl. C08g *9/30*
U.S. Cl. 260—67.6 R 9 Claims

A process for the manufacture of etherified melamine resins by reacting one mol of melamine at an elevated temperature with less than 3 mols of formaldehyde polymer and at least 4 mols of a monohydric aliphatic water-immiscible alcohol in the presence of a catalytic quantity of an acid and continuously removing water by destillation, coatings and an impregnated material containing the products of the process.

3,647,756
PROCESS FOR THE PREPARATION OF GRAFT COPOLYMERS OF ACETALIZED POLYVINYL ALCOHOL WITH METHYL METHACRYLATE
Takuji Okaya and Hirotoshi Miyazaki, Kurashiki, Japan, assignors to Kurashiki Rayon Co., Ltd., Kurashiki, Okayama Prefecture, Japan
No Drawing. Filed Mar. 11, 1969, Ser. No. 806,307
Claims priority, application Japan, Mar. 14, 1968, 43/16,649
Int. Cl. C08f *29/30*
U.S. Cl. 260—73 R 5 Claims

Process for preparation of graft copolymers by two-stage reaction in which at the first stage, a thermoplastic, natural or synthetic high molecular compound such as in the form of fibers, filaments and film is contacted with a vinyl monomer such as acrylic acid, its esters, alkyl methacrylate and acrylonitrile in the presence of at least 20 ppb. of molecular oxygen to the total amount of the reaction liquid; at the second stage, the resulting high molecular compound is contacted, in a system different from the first contact system, with at least one radical-polymeribazle monomer such as acrylonitrile, vinyl chloride, styrene and vinyl acetate, in the optional presence of an inert diluent, in the absence of oxygen or in the presence of no more than 600 ppb. of molecular oxygen to the total amount of the reaction liquid at temperatures ranging from 40 to 120° C. Thus, graft-copolymers in which the radical-polymerizable monomer is grafted uniformly and in great quantity even to the interior of the high molecular compound can be obtained with a very easy operation.

3,647,757

FLEXIBLE, CURABLE HETEROCHAIN POLYMERS

Sung Ki Lee, Niagara Falls, N.Y., assignor to Hooker Chemical Corporation, Niagara Falls, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 569,043, Aug. 1, 1966, now Patent No. 3,489,701. This application Dec. 29, 1969, Ser. No. 888,839

Int. Cl. C08g *17/14, 13/00*

U.S. Cl. 260—72.5 11 Claims

Polymeric materials useful for further reaction with phenol formaldehyde resins to make compositions useful for interior can coatings, drum and pail linings, wire coatings, laminating resins, baking primers, adhesives, pipe coatings, phenolic molding resins, foundry resins and the like are produced by the method comprising steps of:

(1) Reacting a polymer containing alpha,beta-carbon-to-carbon unsaturated carbonyl function with a nucleophilic compound having at least two active hydrogens to form a polymer containing an active pendant nucleophilic group containing at least one active hydrogen.

(2) Reacting the resultant nucleophilic group containing active hydrogen on the said polymer with an aldehyde to form a polymer containing an active pendant methylol derivative group.

The above steps may be carried out as a separate reaction and separately controlled to give the resultant desired polymer properties in a single reaction vessel in sequence.

3,647,758

PROCESS AND APPARATUS FOR THE CONTINUOUS PRODUCTION OF POLYAMIDES AND POLYESTERS

Kaspar Ryffel, Gomat-Ems, Grisons, and Heinz Schneller, Chur, Grisons, Switzerland, assignors to Inventa AG fur Forschung und Patentverwertung, Zurich, Switzerland

Filed Jan. 22, 1970, Ser. No. 4,878

Claims priority, application Switzerland, Jan. 24, 1969, 1,050/69

Int. Cl. C08g *20/10*

U.S. Cl. 260—75 M 3 Claims

The apparatus comprises a polymerization reactor containing a monomer or a monomer precondensate and a polymerization catalyst. The monomer or monomer precondensate is introduced into the reactor by means of a pipe. Said pipe extends downwardly through the inlet port of the reactor to substantially the bottom of same and then runs in an upward direction to substantially the top of the reactor. The monomer or monomer precondensate is heated by the exothermic heat of reaction liberated during the polymerization of said monomer in said reactor. The polymer produced by the polymerization reaction is removed through an outlet port.

3,647,759

RESINOUS REACTION PRODUCT OF ETHYLENE GLYCOL AND DMT ESTERIFIED OXIDATE RESIDUE

John F. Walker, New Castle County, Del., assignor to Hercules Incorporated, Wilmington, Del.

No Drawing. Filed Feb. 4, 1970, Ser. No. 8,696

Int. Cl. C08g *17/08*

U.S. Cl. 260—75 R 2 Claims

Disclosed is a thermoplastic resin which is the reaction product of ethylene glycol and dimethyl terephthalate esterified oxidate residue. The normally solid embodiments of the resin have utility as binders for air or water laid wood or mineral fiber composites. The normally solid and liquid embodiments have utility as polyol reactants for reaction with polyisocyanate material in the production of polyurethane foams, coatings, and films.

3,647,760

TERPOLYMERS OF AN N-VINYL URETHANE, AN ACRYLATE AND AN UNSATURATED NITRILE CARBONATE

Larry G. Wohlgemuth, Cherry Hill, N.J., and William H. Fritock, Glenolden, Pa., assignors to Atlantic Richfield Company, New York, N.Y.

No Drawing. Filed Jan. 14, 1970, Ser. No. 2,973

Int. Cl. C08g *22/00*

U.S. Cl. 260—77.5 BB 10 Claims

Self-curing terpolymers comprising the residues of an N-vinyl urethane, an acrylate and a terminally ethylenically-unsaturated nitrile carbonate are useful in the preparation of thermosetting coatings by baking, in the absence of cross-linking agents or catalysts. These thermosetting coatings may be incorporated into paint coating systems, electrocoating systems, fibers or adhesives.

3,647,761

POLYAMIDES OF A C_{7-12} ALIPHATIC DICARBOXYLIC ACID, TEREPHTHALIC ACID AND AN ALIPHATIC DIAMINE

James S. Ridgway and Oscar A. Pickett, Jr., Pensacola, Fla., assignors to Monsanto Company, St. Louis, Mo.

No Drawing. Continuation-in-part of application Ser. No. 760,087, Sept. 16, 1968. This application June 19, 1970, Ser. No. 47,899

Int. Cl. C08g *20/20*

U.S. Cl. 260—78 R 10 Claims

Fiber-forming polyamides prepared by the condensation of substantially equimolecular proportions of hexamethylene diamine and a mixture of dibasic acids consisting of 50 to 80 mole percent of a C_{7-12} saturated n-aliphatic dicarboxylic acid and from 50 to 20 mole percent of terephthalic acid are particularly useful in the manufacture of hosiery and conjugate yarn.

3,647,762

COPOLYAMIDEIMINE AND COPOLYAMIDEBENZIMIDAZOLE, AND PROCESSES FOR THEIR PREPARATION

Shigeyoshi Hara, Masao Senoo, Tsunemasa Yoshida, and Moriya Uchida, Tokyo, Japan, assignors to Teijin Limited, Osaka, Japan

No Drawing. Filed Jan. 26, 1970, Ser. No. 5,973

Int. Cl. C08g *20/32*

U.S. Cl. 260—78 TF 13 Claims

A novel film-forming aromatic copolyamideimine is provided by reacting 2,4-diaminodiphenylamine or its derivative, an aromatic diamine such as metaphenylene diamine and a benzenedicarboxylic dichloride such as terephthaloyl dichloride. The copolyamideimine is soluble in various organic solvents and easily molded into shaped articles, and can be converted to a thermally stable copolyamidebenzimidazole by heating, preferably in the presence of an acid substance.

3,647,763

CHAIN EXTENDED POLYAMINE RESIN COMPOSITIONS

Hans H. Stockmann, Plainfield, and Dilip K. Ray-Chaudhuri, Somerset, N.J., assignors to National Starch and Chemical Corporation, New York, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 734,894, June 8, 1968. This application Apr. 13, 1970, Ser. No. 27,999

Int. Cl. C08g *20/38*

U.S. Cl. 260—78 SC 1 Claim

High molecular weight, chain extended copolyamide-polyamine resin compositions comprising the reaction product of a chain extension reagent with a copolyamide-polyamine intermediate which comprises the reaction product of a lactone or an alkylester of acrylic or methacrylic acid, a polyalkylene polyamine and a carboxylic

acid reagent. The resulting resin compositions display great versatility in various applications such, for example, as flocculants, and as wet strength and pigment retention additives in the paper making process.

3,647,764

POLYMERIZATION OF 2-PYRROLIDONE IN THE PRESENCE OF CARBONYL SULFIDE

Donald E. Sargent, Schenectady, N.Y., assignor to Radiation Research Corporation, Stamford, Conn.

No Drawing. Filed Aug. 28, 1969, Ser. No. 853,551
Int. Cl. C08g *20/18*
U.S. Cl. 260—78 P **5 Claims**

2-pyrrolidone is polymerized in the presence of an alkaline polymerization catalyst and carbonyl sulfide to form a polymer useful for melt extrusion into fibers, films and other articles.

3,647,765

UNSATURATED POLYAMIDES AND PROCESS FOR OBTAINING SAME

Luigi Mortillaro and Mario Russo, Novara, and Vincenzo Guidotti, Milan, Italy, assignors to Montecatini Edison S.p.A., Milan, Italy

No Drawing. Filed Sept. 9, 1969, Ser. No. 856,474
Claims priority, application Italy, Sept. 11, 1968, 21,082/68
Int. Cl. C08g *20/20*
U.S. Cl. 260—78 UA **16 Claims**

Unsaturated linear polyamides having desirable properties are obtained by reacting or condensing a substituted fumaric acid with a diamine selected from the group consisting of specified aliphatic diamines, secondary cyclic diamines, diamines containing cycloalphatic rings, and diamines containing aromatic carbocyclic rings. The unsaturated linear polyamides of the instant invention are useful for preparing molded goods, sheets, films, and fibers.

3,647,766

METHOD OF MAKING HYDROXYL-TERMINATED POLYSULFIDE POLYMERS

Eugene R. Bertozzi, Yardley, Pa., assignor to Thiokol Chemical Corporation, Bristol, Pa.

No Drawing. Filed Apr. 23, 1970, Ser. No. 31,367
Int. Cl. C08g *11/00, 17/14, 22/14*
U.S. Cl. 260—79 **25 Claims**

Method of making liquid hydroxyl-terminated polysulfide polymers having a random distribution of diverse oxahydrocarbon groups between the polysulfide groups thereof. The hydroxyl-terminated polysulfide polymers are prepared by mixing (1) a liquid polysulfide polymer having mercapto or hydroxyl terminals and having a linear backbone consisting essentially of spaced polysulfide groups and repeating identical oxahydrocarbon groups of the structure —$ROCH_2OR$—, wherein R is lower alkylene, between the polysulfide groups thereof, (2) a hydroxyl-terminated polymer selected from linear polyesters, polyformals of polyalkylene glycols, polyformals, of linear polyesters and mixtures thereof, and (3) a catalytic amount of a strong non-oxidizing mineral acid. The initially incompatible mixture is maintained at a moderately elevated temperature with agitation to cause an interchange reaction to occur which produces a compatible mixture of hydroxyl-terminated polysulfide polymers characterized by the fact that there is a random distribution of diverse oxahydrocarbon groups between the polysulfide groups of the product polymers. In most cases the interchange reaction can be caused to proceed at temperatures within the range 20° C. to 70° C. The product polymers are adapted to be reacted with polyisocyanates to form isocyanate-terminated prepolymers that can be cured by conventional curing agents to form castings, sealants, coatings and the like.

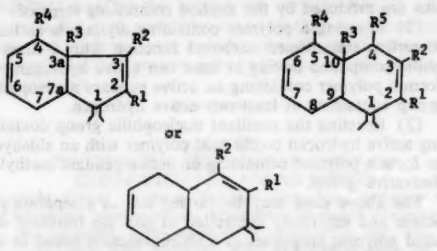
3,647,767

CURABLE, AMORPHOUS, OLEFINIC TERPOLYMERS

Sebastiano Cesca, Arnaldo Roggero, and Walter Marconi, San Donato Milanese, Italy, assignors to Snam Progetti S.p.A., Milan, Italy

No Drawing. Filed Sept. 5, 1969, Ser. No. 855,740
Claims priority, application Italy, Sept. 5, 1968, 20,869/68
Int. Cl. C08f *17/00*
U.S. Cl. 260—80.7 **7 Claims**

Novel terpolymers are disclosed comprising two different α-olefins and an orthocondensed isopropylidene-containing polycyclic polyene having the formulas:



wherein each of said R′, R^2, R^3, R^4 and R^5 is H, methyl or ethyl, provided at least one of said R^1 or R^2 is methyl or ethyl, the concentration of said polycyclic polyene in the terpolymer being from 1 to 30% by weight and the mole ratio of said different alpha-olefins being in the range from 1:4 to 4:1.

3,647,768

PROCESS FOR PREPARING AMORPHOUS COPOLYMERS FROM ETHYLENE AND HIGHER α-OLEFINS BY MEANS OF MODIFIED ORGANOMETAL MIXED CATALYSTS

Helmut Schaum, Bad Soden, Taunus, Germany, assignor to Bunawerke Huls Gesellschaft mit beschrankter Haftung, Germany

Filed Sept. 27, 1968, Ser. No. 763,215
Claims priority, application Germany, Oct. 5, 1967, F 53,681
Int. Cl. C08f *1/56, 15/04*
U.S. Cl. 260—80.78 **15 Claims**

Process for preparing rubber-like amorphous copolymers of ethylene with α-olefins in the presence of modified vanadium-containing mixed catalysts containing as reactivator halogen-containing, alkyl-substituted β-lactones. The catalyst yields are so high that in the case of the precipitation polymerization the polymerization mixture can be worked up by simple filtration. The polymers have a low ash content and are chemically and physically very uniform. The vulcanization products made therefrom have improved mechanical properties.

3,647,769

REACTION PRODUCTS OF POLYNITRILES, WATER AND AMINES

Richard G. Bufton, Painesville, John R. Semancik, Mentor, and George G. King, Painesville, Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

No Drawing. Filed Nov. 14, 1969, Ser. No. 877,008
Int. Cl. C08f *3/90, 3/76, 15/22*
U.S. Cl. 260—85.5 **10 Claims**

Water soluble reaction products are produced by reaction of a polymer or copolymer of acrylonitrile with a primary amine, a secondary amine or a polyamine having a primary or secondary amine group in the presence of water. These reaction products are useful as flocculants in the separation of suspended solids from aqueous systems. The reaction product of polyacrylonitrile, water and N,N-dimethyl-1,3-propanediamine is a useful flocculant in treatment of process water in paper making.

3,647,770

PROCESS FOR FORMATION OF A CYCLIZED ACRYLIC FIBROUS MATERIAL

Klaus H. Gump, Gillette, and Dagobert E. Stuetz, Westfield, N.J., assignors to Celanese Corporation, New York, N.Y.

No Drawing. Filed Nov. 21, 1968, Ser. No. 777,902
Int. Cl. C08f 3/76, 15/02; D01f 7/02
U.S. Cl. 260—85.5 S 11 Claims

An improved process is provided for the formation of fibrous materials of enhanced thermal stability derived from acrylic polymers consisting primarily of recurring acrylonitrile units. A minor quantity of a Lewis acid capable of promoting the cyclization of pendant nitrile groups is incorporated in a solution of the acrylic polymer and a cyclized acrylic material is formed therein which is subsequently spun into a fiber which exhibits no appreciable exothermic reaction when heated to 500° C. Upon subjecting the resulting fiber to relatively mild preoxidation conditions a stabilized fibrous material may be formed which optionally may be carbonized or carbonized and graphitized at elevated temperatures while present in an inert atmosphere.

3,647,771

ALTERNATING COPOLYMERS OF ALPHA-OLEFINS AND VINYL COMPOUNDS AND A PROCESS FOR MANUFACTURING THE SAME

Kohei Nakaguchi, Shohanchi Kawasumi, Masaaki Hirooke, and Hiroshi Yabuuchi, Niihama-shi, Japan, assignors to Sumitomo Chemical Company, Ltd., Higashi-ku, Japan

No Drawing. Filed Jan. 27, 1965, Ser. No. 428,531
Claims priority, application Japan, Jan. 30, 1964, 39/4,401
Int. Cl. C08f 19/10, 15/18
U.S. Cl. 260—86.7 18 Claims

A conjugated vinyl compound having carbonyl or thiocarbonyl group at the conjugated position of the double bond of the vinyl group forms a complex with an organoaluminum halide. The acrylic compound of this kind includes acrylic ester, acrylamide, acryloyl halide, acrylic acid, salts of acrylic acid, acrolein, vinyl ketone and the like. Said acrylic compound is copolymerized with a terminally unsaturated hydrocarbon, such as propylene, isobutylene, styrene, ethylene and the like to form a copolymer, which is a 1:1 alternating copolymer containing alternately the two monomer units. The present invention has, for the first time, enabled a 1:1 alternating copolymer to be produced from the combination of monomers from which only a random copolymer has heretofore been produced, and also enabled a high molecular weight polymer to be easily produced from the combination of monomers which are difficult to copolymerize. The present invention provides such alternating copolymers, and a novel copolymerization process employing a monomer complexed with an organoaluminum halide.

3,647,772

PROCESS FOR POLYMERIZING OR COPOLYMERIZING OLEFINS WITH CARRIER-SUPPORTED CATALYST

Norio Kashiwa, Otake-shi, Japan, assignor to Mitsui Petrochemical Industries, Ltd., Chiyoda-ku, Tokyo, Japan

No Drawing. Filed Dec. 12, 1969, Ser. No. 884,738
Claims priority, application Japan, Dec. 19, 1968, 43/92,635
Int. Cl. C08f 1/56, 3/02
U.S. Cl. 260—88.2 9 Claims

A process for polymerizing or copolymerizing olefins in the presence of a catalyst consisting of

(a) a transition metal component chemically bound and supported on the surface of in organic solid particles, obtained by treating solid particles of magnesium carbonate with an electron donor which is liquid or gaseous under the treating conditions, the amount of said electron donor being preferably at least 0.01 mmol per gram of solid particles of magnesium carbonate, and a transition metal compound which is selected from the group consisting of halogen compounds of titanium and vanadium, the amount of said transition metal compound being preferably such that the supported amount of said compound is 0.1–3 mmols per gram of said solid particles of magnesium carbonate; and,

(b) an organo-metallic compound, preferably in an amount of 0.01–50 mmols per liter of a polymerization solvent.

3,647,773

SUSPENSION POLYMERIZATION IN THE PRESENCE OF α-METHYL STYRENE

Keitaro Ohe, Daijiro Nishio, and Shigeru Sadamatsu, Isaida Odawara-shi, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 22, 1969, Ser. No. 793,062
Claims priority, application Japan, Jan. 22, 1968, 43/3,589
Int. Cl. C08f 3/64, 3/30, 7/04
U.S. Cl. 260—88.7 8 Claims

A process for suspension polymerization of vinyl compounds in the presence of α-methylstyrene and a slightly water soluble inorganic salt or a water soluble high molecular weight compound.

3,647,774

PROCESS AND COMPOSITION FOR WATER-SOLUBLE POLYMERS

Frederick J. Webb, Akron, and David P. Tate, Northfield, Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

No Drawing. Filed Aug. 29, 1969, Ser. No. 854,321
Int. Cl. C08d 3/06, 5/02, 5/04
U.S. Cl. 260—94.2 R 8 Claims

This invention comprises water-soluble polymers from polydienes having a substantial amount of repeating units with pendent vinyl groups, such as high-vinyl polybutadiene, and the process for preparing such water-soluble polymers. The process involves the anti-Markownikoff addition of hydrogen bromide to the pendent vinyl groups to give the primary bormide derivative groups, which upon the addition of a tertiary amine, give quaternary ammonium groups which impart water solubility to the polymers. These products are particularly useful for the flocculation of solids from suspensions thereof, such as elutriated sewage.

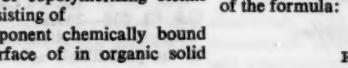
3,647,775

N-ACYL-α-AMINO-ACID AMINES OR PEPTIDES AND THEIR PRODUCTION

Dieter Marquarding, Bonn, Ivar V. Ugi, Arzbach, Bad Tolz, Helmut Kleimann, Leverkusen, and Peter Hoffmann, Cologne-Stammheim, Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

No Drawing. Filed Sept. 5, 1968, Ser. No. 757,778
Claims priority, application Germany, Sept. 25, 1967, P 16 43 362.8
Int. Cl. C07c 103/02; C07f 11/00, 15/00
U.S. Cl. 260—112.5 7 Claims

Thickening agents for lacquers, plasticizers for polyvinyl chloride or antibiotic-like compounds are provided of the formula:



in which R^1 is hydrogen, hydrocarbon of up to 15 carbon atoms, said hydrocarbon substituted by halogen, keto, mercapto, alkylmercapto, carbalkoxy, hydroxy or azido, or said hydrocarbon having an O, S or N heteroatom, R^2 is hydrogen or alkyl of 1–4 carbon atoms, R^3 is hydrogen hydrocarbon of up to 20 carbon atoms, said hydrocarbon substituted by halogen, azido, nitro, carbalkoxy or protected amino, or said hydrocarbon having an N heteroatom and R^4 is alkyl, alkenyl, aralkyl or such substituted in the α-position by a carboxylic ester or carbonamido group, or aryl.

Metallocene derivatives are included such as ferrocenylalkyls or radicals containing other transition metals such as molybdenum or chromium.

3,647,776
1-HYDROXY- AND ACETYLOXY-3-(1-HEXENYLAZOXY)-2-BUTANONE

William James McGahren, Demarest, and John Norman Porter, Ramsey, N.J., and Joseph Daniel Korshalla, Pearl River, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

No Drawing. Filed Apr. 2, 1969, Ser. No. 812,861
Int. Cl. A01n 9/20; C07c 105/00; C12k 1/06
U.S. Cl. 260—143 **2 Claims**

This disclosure describes 1-hydroxy-3-(1-hexenylazoxy) - 2 - butanone and 1-acetyloxy-3-(1-hexenylazoxy)-2-butanone, compounds useful as antifungal agents.

3,647,777
MIXED NITROSO HYDROCARBONS

Russell L. Hudson, Kenneth C. Williams, and Martin B. Smith, Baton Rouge, La., assignors to Ethyl Corporation, New York, N.Y.

No Drawing. Filed Nov. 12, 1969, Ser. No. 876,076
Int. Cl. C07c 81/00, 105/00
U.S. Cl. 260—143 **5 Claims**

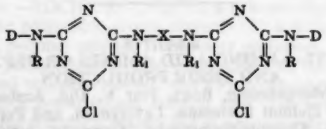
A method of making or preparing mixed nitrosoalkane or nitroso aromatic dimers for use as antiknock compounds.

3,647,778
REACTIVE DISAZO DYESTUFFS CONTAINING TRIAZINES

Herbert Francis Andrew and Cecil Vivian Stead, Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

No Drawing. Filed Jan. 12, 1970, Ser. No. 2,390
Claims priority, application Great Britain, Jan. 16, 1969, 2,664/69
Int. Cl. C09b 62/08
U.S. Cl. 260—153 **5 Claims**

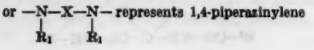
Dyestuffs represented by the general formula:



wherein D represents a radical of the azonaphthalene or phenylazo naphthalene series which contains at least three SO_3H groups,

Either R and R_1 represent H or saturated aliphatic radicals having up to 4 carbon atoms, and

X represents a benzene, diphenylene or naphthalene nucleus which may contain substituents or an aliphatic radical having at least two carbon atoms,



are valuable reactive dyestuffs for cellulose providing a wide range of shades having excellent fastness to washing and to light. They are notable for the high proportion which fixes on the fibre, especially when applied from saline dyebaths.

3,647,779
KASUGAMYCIN SUBSTITUTED ANTIBACTERIAL AGENTS

Henry Schmitz, Syracuse, N.Y., assignor to Bristol-Myers Company, New York, N.Y.

No Drawing. Filed May 1, 1970, Ser. No. 33,982
Int. Cl. C07c 47/18
U.S. Cl. 260—210 R **17 Claims**

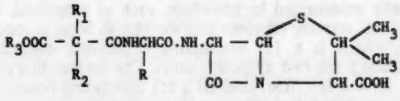
5-[2-amino - 2,3,4,6 - tetradeoxy - 4 - substituted-carboxamidino - α - D - arabinohexopyranosyl]-[IR:2S:3S:4R:5R:6R] - inositols are semi-synthetic kasugamycin derivatives possessing antibacterial properties. The compound 5-[2 - amino - 2,3,4,6 - tetradeoxy-4-(4-piperidylcarboxamidino) - α - D-arabinohexopyranosyl]-[IR:2S:3S:4R:5R:6R]-inositol has been found to be especially active against gram-negative and gram-positive bacteria, most particularly those of the Pseudomonas genus.

3,647,780
α-(α-CARBOXYACYLAMINO) ARALKYL-PENICILLINS

Kenneth David Hardy, Horsham, Sussex, England, assignor to Beecham Group Limited, Middlesex, England

No Drawing. Continuation of abandoned application Ser. No. 792,139, Jan. 17, 1969. This application Mar. 23, 1970, Ser. No. 20,457
Claims priority, application Great Britain, Jan. 19, 1968, 2,968/68
Int. Cl. C07d 99/16
U.S. Cl. 260—239.1 **7 Claims**

α-(α-Carboxyacylamino)-aralkyl penicillins having activity against micro-organisms of the genus Pseudomonas are described. The penicillins have the formula:



or a pharmaceutically acceptable non-toxic salt thereof wherein

R is phenyl or thienyl,
R_1 is lower alkyl, phenyl, benzyl, phenoxy, benzyloxy, carboxyphenyl or carboxybenzyl,
R_2 is hydrogen or lower alkyl and
R_3 is hydrogen, lower alkyl, phenyl or benzyl,

and a typical compound is D-α-[α-(benzyloxycarbonyl)β-phenylpropionamido]-benzylpenicillin.

3,647,781
IMINES OF NITROHETEROCYCLIC ALDEHYDES AND COMPOUNDS OF THE PENICILLANIC ACID OR CEPHAM SERIES

Frederick Y. Wiselogle, North Brunswick, and Jack Bernstein, New Brunswick, N.J., assignors to E. R. Squibb & Sons, Inc., New York, N.Y.

No Drawing. Filed Aug. 14, 1969, Ser. No. 850,256
Int. Cl. C07d 99/24, 99/16
U.S. Cl. 260—239.1 **7 Claims**

Imines of nitroheterocyclic aldehydes and compounds of the penicillanic acid or cepham (including cephem)

series containing an α-amino-carbocyclic-alkanoylamido group in the 6 or 7 position, respectively, are prepared. These compounds are useful as antibacterial, antitrichomonal and antifungal agents.

3,647,782
BIS (3,3-DICHLORO-2-OXO-POLYMETHYLENE-IMINES)

Joseph C. Collins, East Greenbush, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 673,926, Oct. 9, 1967. This application Sept. 29, 1969, Ser. No. 862,084

Claims priority, application Great Britain, Oct. 1, 1968, 46,633/68

Int. Cl. C07d *41/06*

U.S. Cl. 260—239.3 R **8 Claims**

The invention relates to 3,3 - dichloro-2-oxopolymethylenimines and bis(3,3 - dichloro - 2-oxopolymethylenimines) having useful anti-inflammatory properties as determined by their inhibition of carrageenan induced edema in rats.

3,647,783
(2-SUBSTITUTED - 5 - OXO-CYCLOPENT-1-ENYL) ESTERS OF α-CARBOXYARYLMETHYL PENICILLINS

Donald K. Pirie, Uncasville, Conn., assignor to Chas. Pfizer & Co., Inc., New York, N.Y.

No Drawing. Filed Aug. 4, 1969, Ser. No. 847,432

Int. Cl. C07d *99/16*

U.S. Cl. 260—239.1 **8 Claims**

A series of α-{carbo-[1-(2-substituted-5-oxo-cyclopent-1-enyloxy]}arylmethyl penicillins wherein the substituent is lower alkyl or benzyl and methods for their preparation are described.

3,647,784
PREPARATION OF STEROIDAL FORMATE ESTERS

Reinhardt P. Stein, Conshohocken, Robert C. Smith, Jr., King of Prussia, and Herchel Smith, Bryn Mawr, Pa., assignors to American Home Products Corporation, New York, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 706,659, Feb. 19, 1968. This application Feb. 2, 1970, Ser. No. 8,056

Int. Cl. C07c *173/00*

U.S. Cl. 260—239.55 R **26 Claims**

A procedure is disclosed for the selective preparation of steroidal formate esters from corresponding steroid alcohols. Products formed by the conversion are not only hormonally useful in the animal body but are also useful for further reactions of the steroid nucleus.

3,647,785
NOVEL 3-INDOLYLALIPHATIC ACID ANHYDRIDES

Seitetsu Arasaki, Minoo-shi, and Hisao Yamamoto and Shigeho Inaba, Nishinomiya-shi, Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

No Drawing. Filed Apr. 15, 1968, Ser. No. 721,200

Claims priority, application Japan, Apr. 25, 1967, 42/26,772; May 12, 1967, 42/30,289

Int. Cl. C07d *27/32*

U.S. Cl. 260—240 J **3 Claims**

Novel 3-indolylaliphatic acid anhydrides having prominent anti-inflammatory activity are prepared by dehydrating 3-indolylaliphatic acid derivatives with a dehydrating agent such as dicyclohexylcarbodiimide in the absence or presence of an inert solvent.

3,647,786
PREPARATION OF CEPHALOSPORIN SULFOXIDES

Robin D. G. Cooper, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

No Drawing. Filed Oct. 3, 1968, Ser. No. 764,939

Int. Cl. C07d *99/24*

U.S. Cl. 260—243 C **10 Claims**

Cephalosporins are oxidized to the corresponding cephalosporin sulfoxides by treatment with an inorganic peracid having a reduction potential of at least +1.5 volts and containing only nonmetallic elements, organic carboxylic peracids, or mixtures of hydrogen peroxide and an acid having a dissociation constant of at least 10^{-5}.

3,647,787
PROCESS IMPROVEMENT FOR CONVERTING PENICILLIN SULFOXIDE ESTERS TO CEPHEM COMPOUNDS

Robin D. G. Cooper, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

No Drawing. Continuation-in-part of applications Ser. No. 636,592, Ser. No. 636,593, and Ser. No. 636,629, all May 8, 1967. This application July 2, 1969, Ser. No. 838,697

Int. Cl. C07d *99/24*

U.S. Cl. 260—243 C **25 Claims**

Tertiary carboxamides, urea derivatives, and/or sulfonamides are used to direct the conversion of penicillin sulfoxide esters, via exposure to acid conditions at elevated temperature, more specifically toward production of desacetoxycephalosporin antibiotics.

3,647,788
CEPHALOSPORINS HAVING A 3-THIOETHER GROUP

John Colin Clark, Gerrards Cross, Brian Richard Cowley, Greenford, and Gordon Ian Gregory, Chalfont St. Peter, England, James Kennedy, Montrose, Angus, Scotland, and Alan Gibson Long, Greenford, England, assignors to Glaxo Laboratories Limited, Middlesex, England

No Drawing. Continuation-in-part of application Ser. No. 752,140, Aug. 13, 1968. This application June 13, 1969, Ser. No. 833,149

Claims priority, application Great Britain, June 14, 1968, 28,528/68

Int. Cl. C07d *99/24*

U.S. Cl. 260—243 C **23 Claims**

7-acylamido cephalosporanic acids and non-toxic salts thereof having a thioether group at the 3-position, the acyl group in the 7-substituent being of the aliphatic, heterocyclic araliphatic containing 1 or 2 hetero atoms, araliphatic or cycloaliphatic series, an araliphatic acyl group having an atomic weight sum of at least 120 when the aryl moiety thereof is a carbocyclic aromatic group. Such compounds are antibiotics more resistant to metabolic processess reducing antibiotic activity than are cephalosporins possessing a 3-acetoxymethyl group and certain of them show significant absorption after oral administration.

3,647,789
CEPHALOSPORANIC ACIDS

Leonard Bruce Crast, Jr., Clay, N.Y., assignor to Bristol-Myers Company, New York, N.Y.

No Drawing. Filed Nov. 13, 1969, Ser. No. 876,596

Int. Cl. C07d *99/24*

U.S. Cl. 260—243 C **11 Claims**

Certain 7-[α-(2,6-dihalo-4-pyridylthio)acetamido]cephalosporanic acids and derivatives thereof have shown pronounced antibacterial activity against gram-positive and gram-negative bacteria and in particular the acid-

fast bacteria, Mycobacterium tuberculosis H37Rv. A preferred compound, 7-[α-(2,6-dichloro-4-pyridylthio)acetamido]cephalosporanic acid is prepared by the condensation of 2,6-dichloro-4-mercaptopyridine with 7-(α-bromoacetamido)cephalosporanic acid.

3,647,790

QUINOXALINYL-OXAZOLIDINES AND -OXAZINES

John R. Potoski, Rosemont, and Meier E. Freed, Philadelphia, Pa., assignors to American Home Products Corporation, New York, N.Y.

No Drawing. Filed Apr. 8, 1969, Ser. No. 814,442
Int. Cl. C07d 87/06
U.S. Cl. 260—244 R 11 Claims

Novel 2-quinoxalinyl-oxazolidine-3-amides and -sulfonamides and 2-quinoxalinyl-oxazine-3-amides and -sulfonamides (I) are provided, with pharmacological activity as nervous system depressants and utility to induce calming. Compounds (I) are prepared by condensing a [(2-quinoxalinylmethylene)amine]alkanol (II) with a benzoyl- or phenylsulfonyl-chloride (III).

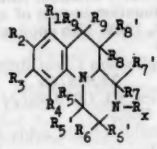
3,647,791

2,3,4,4a,5,6-HEXAHYDRO - 1H - PYRAZINO [1,2-a] QUINOLINES AND PHARMACEUTICAL COMPOSITIONS CONTAINING SAME

Alberto Rossi, Oberwil, Basel-Land, and Ernst Sury, Basel, Switzerland, assignors to Ciba Corporation, New York, N.Y.

No Drawing. Filed Sept. 19, 1967, Ser. No. 668,957
Claims priority, application Switzerland, Oct. 5, 1966, 14,363/66; Feb. 2, 1967, 1,561/67, 1,562/67, 1,563/67; Aug. 11, 1967, 11,361/67, 11,362/67, 11,363/67, 11,364/67, 11,365/67
Int. Cl. C07d 51/72
U.S. Cl. 260—268 TR 31 Claims

Compounds of the formula



R_1 to R_4=H, alkyl, alkoxy, alkenyloxy, halogen, trifluoromethyl, methylenedioxy, hydroxy, acyloxy, nitro, amino or acylamino,

R_5, R_5', R_6, R_9', R_7, R_7', R_8, R_8', R_9, R_9'=hydrogen or alkyl,

R_x=hydrogen, an aliphatic hydrocarbon radical which may be substituted by an oxo group, by a free, etherified or acylated hydroxyl group or by a free or functionally converted carboxyl group, a cycloaliphatic hydrocarbon radical, a cycloaliphatic-aliphatic hydrocarbon radical which may be substituted in the aliphatic portion by an oxo group or by a free, etherified or acylated hydroxyl group, an araliphatic hydrocarbon radical which may be substituted in the aliphatic portion by an oxo group or by a free, etherified or acylated hydroxyl group and which may further be substituted in the aromatic portion, or a heterocyclic-aliphatic radical which may be substituted in the heterocyclic portion; and their salts and pharmaceutical compositions containing these compounds, for example: 3-benzyl-2,3,4,4a,5,6-hexahydro-1H-pyrazino[1,2-a]quinoline.

Use: antihypertensives and sedatives.

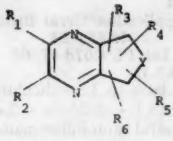
3,647,792

HETEROCYCLIC PYRAZINES

William J. Evers, Long Branch, Ira Katz, Elberon, Richard A. Wilson, Edison, and Ernst T. Theimer, Rumson, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

No Drawing. Filed May 4, 1970, Ser. No. 34,583
Int. Cl. C07d 51/76
U.S. Cl. 260—250 R 8 Claims

Processes for altering the flavors of products, including foodstuffs and tobaccos, which comprise adding thereto a small but effective amount of at least one heterocyclic pyrazine having the formula:



wherein Y is —O—, —S—, —CH_2—O—, or —CH_2—S—, and R_1, R_2, R_3, R_4, R_5 and R_6 are the same or different and represent hydrogen and lower alkyl; the products so produced; flavoring and flavor-enhancing compositions containing such heterocyclic pyrazines; and novel heterocyclic pyrazines and processes for their production.

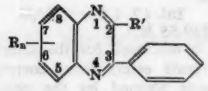
3,647,793

2-PIPERIDINO-3-PHENYLQUINOXALINE COMPOUNDS

Quentin Francis Soper, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

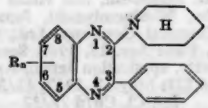
No Drawing. Original application Mar. 22, 1968, Ser. No. 715,144, now Patent No. 3,582,315. Divided and this application Nov. 5, 1969, Ser. No. 871,035
Int. Cl. C07d 51/78
U.S. Cl. 260—250 R 2 Claims

The present invention is concerned with methods and compositions useful in inhibiting the growth of plants, and is particularly directed to methods employing and compositions comprising an active agent which is a compound of the formula



or its acid addition salts, wherein R represents halo or methyl, said R being located on the 6 or 7 position, only; R' represents halo, hydroxy, loweralkoxy, amino, n-loweralkylamino, di-n-loweralkylamino, or piperidino; and *n* represents an integer of from 0 to 1, both inclusive.

The present invention is also directed to the novel compound of the formula



and its acid addition salts, wherein R, as above, represents halo or methyl, said R being located on the 6 or 7 position, only, and *n* represents an integer of from 0 to 1, both inclusive.

3,647,794

s-TRIAZINE COMPOUNDS

Gilbert Regnier, Sceaux, Roger Canevari, Clamart, and Michel Laubie, Vaucresson, France, assignors to Societe en nom collectif "Science Union et Cie," Societe Francaise de Recherche Medicale

No Drawing. Filed Sept. 26, 1969, Ser. No. 861,448

Claims priority, application Great Britain, Oct. 2, 1968, 46,802/68

Int. Cl. C07d *55/22*

U.S. Cl. 260—249.6 7 Claims

1-(4,6-R'-amino-2-s-triazinyl)-4-R - piperazines wherein R' is alkenyl or alkynyl which are optionally substituted and R is hydrogen, phenyl, pyridyl, pyrimidyl, pyrazinyl, benzyl, phenylalkyl or diphenylalkyl which are optionally substituted, having respiratory analeptic properties.

3,647,795

VAPOR PHASE PROCESS FOR PRODUCTION OF N,N'-DISUBSTITUTED PIPERAZINES

Bernard R. Bluestein, Glen Rock, and Jack M. Solomon, West Caldwell, N.J., assignors to Witco Chemical Company, Inc., New York, N.Y.

No Drawing. Filed Jan. 10, 1968, Ser. No. 696,707

Int. Cl. C07d *51/70*

U.S. Cl. 260—268 SY 6 Claims

N,N'-disubstituted piperazines are prepared in a vapor phase process at atmospheric pressure by cyclodehydration of the corresponding N-substituted ethanolamine in the presence of an activated alumina catalyst.

3,647,796

CYCLICAMINO ALKYLAMINOTHIOACRIDINE

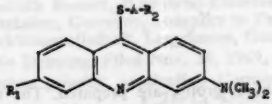
Edward F. Elslager, Ann Arbor, Mich., assignor to Parke, Davis & Company, Detroit, Mich.

No Drawing. Filed Dec. 23, 1968, Ser. No. 786,435

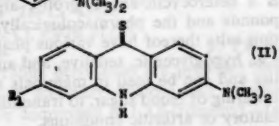
Int. Cl. C07d *37/22*

U.S. Cl. 260—279 R 6 Claims

Novel alkylaminothioacridines (I) are provided by condensing the corresponding acridinethione (II) with a haloalkylamine of formula X—A—R_3 or by condensing 9-chloro-3-(dimethylamino)acridine with a mercaptoalkylamine of formula HS—A—R_2 where R_1 is H or dimethylamino, R_2 is a cyclic nitrogen-containing group (morpholino; morpholinyl; 2-, 3- or 4-pyridyl or 4 to 6 carbon azacycloalkyl containing at least 4 carbon atoms joined annularly with nitrogen); A is a divalent hydrocarbon group containing up to 3 carbon atoms or a direct bond attaching R_3 in a manner providing at least a two-carbon separation between the R_3-nitrogen and the attaching bond; and X is a halogen atom. The acridine products are useful as antiparasitic and antibacterial agents, and as inhibitors of blood platelet aggregation



(I)



(II)

3,647,797

6-CHLORO - 2,3-DIHYDROSPIRO(NAPHTHALENE-1(7*H*),3'-PIPERIDINE)-2',4,6'-TRIONES

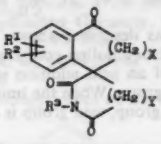
Albert A. Carr and Donald R. Meyer, Cincinnati, Ohio, assignors to Richardson-Merrell Inc., New York, N.Y.

No Drawing. Filed July 24, 1969, Ser. No. 844,613

Int. Cl. C07d *29/20*

U.S. Cl. 260—281 2 Claims

Compounds having the general formula:



wherein R^1 and R^2 represent hydrogen, halogen, lower alkyl, lower alkoxy, or nitro, and wherein R^1 and R^2 may be the same or different. R^3 may be hydrogen or lower alkyl, and X and Y may be one or two. They have been found to be useful sedative type depressants of the central nervous system.

Most of the compounds having the general formula indicated above are new but others such as 2,3-dihydrospiro[naphthalene - 1(4*H*),3' - piperidine] - 2',4,6'-trione which has useful sedative properties have been reported in the literature.

3,647,798

PIGMENTS OF THE PERYLENE TETRACARBOXYLIC ACID DIIMIDE SERIES

Georg Anton Klein, Bottmingen, Basel-Land, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

No Drawing. Filed Oct. 24, 1969, Ser. No. 869,367

Claims priority, application Switzerland, Nov. 5, 1968, 16,460/68

Int. Cl. C07d *55/06*

U.S. Cl. 260—281 9 Claims

N,N'-bis-(1,2,4-triazol-5-yl)-perylene - 3,4,9,10 - tetracarboxylic acid diimide optionally substituted in 3-position of the triazole rings are disclosed. The claimed compounds are highly valuable pigments which are distinguished by good fastness to heat, light, migration, overvarnishing and solvents. Their use in high-molecular organic material, e.g. lacquers, plastic materials, spinmasses for synthetic fibres or printing pastes, are described.

3,647,799

6,7-DIACYLOXY-TETRAHYDROISOQUINOLINE COMPOUNDS

Toshio Watanabe, Takatsuki-shi, Goro Tsukamoto and Kimiaki Hayashi, Nara-shi, Masanori Sato, Toda-shi, and Yoshio Iwasawa, Urawa-shi, Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

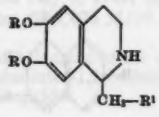
No Drawing. Filed Dec. 4, 1969, Ser. No. 882,296

Claims priority, application Japan, Dec. 10, 1968, 43/90,741

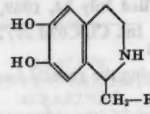
Int. Cl. C07d *35/10*

U.S. Cl. 260—286 R 6 Claims

A process for preparing a compound having the formula:



wherein R represents a lower alkanoyl radical and R^1 represents a trimethoxyphenyl radical, and pharmaceutically acceptable acid addition salts thereof, which comprises the steps of treating with an acylating agent a 6,7-dihydroxy-tetrahydroisoquinoline compound having the general formula:



wherein R^1 is as described above. The imino radical of said tetrahydroisoquinoline compound is protected either by formation of an acid addition salt or by the addition of a protective group. When the imino radical is protected by a protective group, said group is eliminated after treating.

3,647,800

10-SUBSTITUTED - 1,2,3,4 - TETRAHYDROBENZO [b][1,6]NAPHTHYRIDINES USEFUL AS CNS DEPRESSANTS

Milton Wolf, West Chester, and James L. Diebold, Havertown, Pa., assignors to American Home Products Corporation, New York, N.Y.

No Drawing. Division of application Ser. No. 760,063, Sept. 16, 1968, now Patent No. 3,580,915, dated May 25, 1971, which is a continuation-in-part of applications Ser. No. 533,793 and Ser. No. 533,802, both Mar. 14, 1966, and Ser. No. 581,756, Sept. 22, 1966. Divided and this application Apr. 30, 1970, Ser. No. 33,511

Int. Cl. C07d *39/00*

U.S. Cl. 260—287 R **5 Claims**

This invention concerns 1,2,3,4 - tetrahydrobenzo[b]-[1,6]naphthyridines, 1,2,3,4,4a,5,10,10a-octahydrobenzo-[b][1,6]naphthyridines and the pharmacologically acceptable acid addition salts thereof which are pharmacologically active as central nervous system depressants which are useful in producing a calming effect in warm-blooded animals. Further, this invention concerns a process for the preparation of 10 - amino - 1,2,3,4-tetrahydrobenzo-[b][1,6]naphthyridines.

3,647,801

THERAPEUTICALLY ACTIVE 10-METHOXY-DESERPIDINE

Theodor Petrzilka, Zurich, and Albert Hofmann, Hansruedi Schenk, and Franz Troxler, Basel, Switzerland, and Albert Frey and Hans Ott, Hanover, N.J., assignors to Sandoz Ltd. (also known as Sandoz A.G.), Basel, Switzerland

No Drawing. Continuation-in-part of application Ser. No. 728,112, Apr. 14, 1958. This application Dec. 12, 1963, Ser. No. 329,972

Int. Cl. C07d *57/10*

U.S. Cl. 260—287 A **1 Claim**

Disclosed are levorotatory 10-methoxy-deserpidine and related compounds useful as hypotensive agents.

3,647,802

2-AMINO-4-ARYL-3,4-DIHYDROQUINOLINES

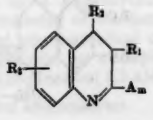
Richard William James Carney, New Providence, N.J., assignor to Ciba Corporation, Summit, N.J.

No Drawing. Continuation-in-part of application Ser. No. 638,593, May 15, 1967, now Patent No. 3,538,101. This application Jan. 22, 1970, Ser. No. 5,106

Int. Cl. C07d *33/52*

U.S. Cl. 260—288 **4 Claims**

2 - amino - 4 - aryl - 3,4 - dihydroquinolines, e.g. those of the formula



Am=an amino or hydrazino group

R_1=H, aliphatic, araliphatic or aromatic radical

R_2=aromatic radical

R_3=H, alkyl, alkoxy, alkylmercapto, halogeno, CF_3, NO_2 or amino acyl derivatives, quaternaries and salts thereof, exhibit anti-inflammatory effects.

3,647,803

METHOD FOR HYDROCARBON SOLUBLE ORGANO SODIUM COMPOUNDS

Richard J. Schlott, Arlington Heights, Donald F. Hoeg, Mount Prospect, and John F. Pendleton, Barrington, Ill., assignors to Borg-Warner Corporation, Chicago, Ill.

No Drawing. Continuation-in-part of application Ser. No. 626,979, Mar. 30, 1967. This application Mar. 24, 1970, Ser. No. 22,394

Int. Cl. C07d *51/70*

U.S. Cl. 260—268 T **6 Claims**

A method of providing active hydrocarbon soluble organosodium reagents by reacting organosodium compounds with aliphatic tertiary diamines and separating the homogeneous active hydrocarbon soluble organosodium products from the insoluble organosodium preparation by-products.

3,647,804

CYCLOALKANECARBOXAMIDES

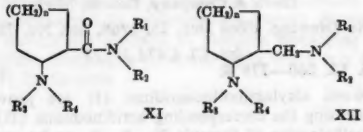
Ronald H. Rynbrandt and Louis L. Skaletzky, Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

No Drawing. Continuation-in-part of application Ser. No. 848,089, Aug. 6, 1969. This application Feb. 27, 1970, Ser. No. 15,247

Int. Cl. C07d *29/30*

U.S. Cl. 260—293.63 **5 Claims**

Compounds of Formulae XI and XII (both in cis and trans forms)



XI XII

wherein n is a number of 1 to 3, inclusive; R_1 is hydrogen, alkyl of 1 to 6 carbon atoms, inclusive, or cycloalkyl of 5 to 7 carbon atoms, inclusive; R_2 is alkyl or cycloalkyl defined as above, or together

is a heterocyclic-amino group; and R_3 and R_4 are alkyl or together

is a heterocyclic-amino group, are prepared. The compounds and the pharmacologically acceptable acid addition salts thereof have various pharmacological activities, e.g., hypoglycemic, sedative, and anti-inflammatory activities and can be used in mammals and birds to produce a lowering of blood sugar, to tranquilize or to reduce inflammatory or arthritic conditions.

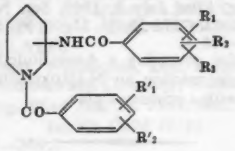
3,647,805

BENZOYLAMINO SUBSTITUTED 1-BENZOYL-PIPERIDINES

Tsutomu Irikura, Kasuga, Kazunori, and Mitsuru Segawa, Tokyo, Japan, assignors to Kyorin Seiyaku Kabushiki Kaisha, Tokyo, Japan

No Drawing. Filed July 11, 1969, Ser. No. 841,102
Int. Cl. C07d 29/30
U.S. Cl. 260—293.77 17 Claims

Aminopiperidine derivatives of the formula



wherein substituted benzamide radical attaches to 2,3,4-positions in the piperidine nucleus, and each R_1, R_2, R_3 is hydrogen or lower alkoxy which can be changed independently. R'_1, R'_2 of substituted benzoyl radical which attaches to nitrogen or piperidine nucleus are hydrogen or amino radical and at least one of R'_1, R'_2 indicates amino radical.

The new compounds exhibit therapeutic effect for experimental gastric ulcer.

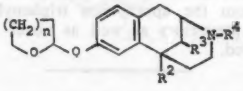
3,647,806

TETRAHYDROPYRANYL AND TETRAHYDROFURANYL BENZOMORPHAN ETHERS

Alexander D. Cross, Mexico City, Mexico, assignor to Syntex Corporation, Panama, Panama

No Drawing. Original application Apr. 18, 1966, Ser. No. 543,028, now Patent No. 3,476,757. Divided and this application June 20, 1969, Ser. No. 844,238
Int. Cl. C07d 39/00
U.S. Cl. 260—293.54 10 Claims

Compounds of the formula



wherein n has a value of 1 or 2; R^2 is hydrogen, lower alkyl, lower alkoxy-lower alkyl, phenyl or halophenyl; R^3 is hydrogen or lower alkyl; and R^4 is methyl, phenylethyl, cyclopropylmethyl, allyl, propargyl, 3,3-dimethylallyl or 3-chloroallyl. These compounds have analgesic and antitussive properties.

3,647,807

N-ALKYL-1,4-DIHYDROPYRIDINES

Friedrich Bossert, Wuppertal-Elberfeld, and Wulf Vater, Opladen, Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

No Drawing. Filed Nov. 28, 1969, Ser. No. 880,946
Claims priority, application Germany, Dec. 7, 1968, P 18 13 436.6
Int. Cl. C07d 31/36
U.S. Cl. 260—295.5 R 37 Claims

New 1,4-dihydropyridine derivatives are provided having beneficial effects as coronary dilators and spasmolytics. A representative compound is 1,2,6-trimethyl-4-(α-pyridyl)-1,4-dihydropyridine-3,5-dicarboxylic acid dimethyl ester having typical charactertistics of the new compounds.

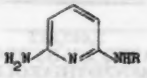
3,647,808

N-SUBSTITUTED DIAMINOPYRIDINES

Eberhard Hofmann, Essen-Bredeney, and Ulrich Holtschmidt, Essen, Germany, assignors to Th. Goldschmidt A.-G., Essen, Germany

No Drawing. Filed Feb. 10, 1970, Ser. No. 10,282
Claims priority, application Germany, Feb. 18, 1969, P 19 09 065.4
Int. Cl. C07d 31/42
U.S. Cl. 260—296 R 7 Claims

N-substituted diaminopyridines of the formula



wherein R is alkyl with 8 to 18 carbon atoms or stands for benzyl chlorinated or brominated in 2- and/or 4-position. The novel compounds have pronounced biocidal characteristics.

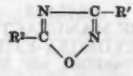
3,647,809

CERTAIN PYRIDYL-1,2,4-OXADIAZOLE DERIVATIVES

Kalman Harsanyi Jozsef Reiter, Dezso Korbonits, Csaba Gonczi, Kalman Takacs, Erzsebet Bako, Gyorgy Leszkovszky, Laszlo Tardos, and Csaba Vertesy, Budapest, Hungary, assignors to Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara Rt., Budapest, Hungary

No Drawing. Filed Apr. 8, 1969, Ser. No. 815,520
Claims priority, application Hungary, Apr. 26, 1968, CI-796
Int. Cl. C07d 31/42
U.S. Cl. 260—296 R 4 Claims

A 1,2,4-oxadiazole for use as a pharmaceutically active agent with spasmolytic, antipyretic, analgesic, hypnotic or antirheumatic properties. The compound is of the formula



wherein R^1 consists of 2-pyridyl, 3-pyridyl or 4-pyridyl unsubstituted or substituted with an alkyl group having 1 to 6 carbon atoms, and wherein R^2 is phenyl, halophenyl aminophenyl, hydroxyphenyl or chlorophenoxymethyl. The application also discloses the hydrochloride, hydrobromide, sulfate, phosphate, maleate, lactate, acetate or tartarate acid-addition salt of the 1,2,4-oxadiazole and its alkylhalogenide-quaternized or alkylsulfate-quaternized pharmaceutically acceptable salt wherein the alkyl group of the quaternizing compound contains 1 to 6 carbon atoms.

3,647,810

1,2,4-TRIAZOLE METAL SALT COMPLEXES

Horst O. Bayer, Levittown, Richard S. Cook, Doylestown, and William C. von Meyer, Willow Grove, Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

No Drawing. Filed July 3, 1969, Ser. No. 847,482
Int. Cl. C07d 55/06
U.S. Cl. 260—299 10 Claims

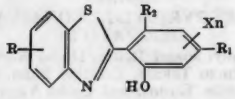
Novel compounds belonging to the class of metal salt complexes of 4-substituted-1,2,4-triazoles. These compounds are useful fungicides.

3,647,811
PRODUCTION OF 2,2'-BIS-[1,3,4-THIADIAZOLINE-5-THIONE]
Hans-Dieter Rupp and Helmut Magerlein, Erlenbach, Germany, assignors to Glanzstoff AG, Wuppertal, Germany
No Drawing. Filed Nov. 21, 1969, Ser. No. 878,946
Claims priority, application Germany, Dec. 14, 1968, P 18 14 772.3
Int. Cl. C07d *91/62*
U.S. Cl. 260—302 SD **10 Claims**

A process for the production of 2,2'-bis-[1,3,4-thiadiazoline-5-thione] by reacting oxalic acid bisamidrazone with carbon disulfide, preferably in water, at approximately room temperature up to moderately elevated temperatures. The product is useful in lithographic printing and photographic development.

3,647,812
HALOGENATED 2(2'-HYDROXYPHENYL BENZOTHIAZOLES
Richard F. Smith, 5 Courtney Court, Easton, Pa. 18042
No Drawing. Filed Apr. 22, 1969, Ser. No. 818,414
Int. Cl. C07d *11/44*
U.S. Cl. 260—304 **18 Claims**

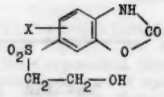
Halogenated derivatives of 2(2'-hydroxyphenyl) benzothiazole having the formula:



wherein R represents hydrogen, SO_3H, alkyl, aryl, cycloalkyl, hydroxy or halogeno; R_1 and R_2 individually represent hydrogen, hydroxy or X, X represents a halogen such as chloro, fluoro, bromo and iodo and *n* represents the integer 1 or 2 such derivatives being water insoluble fluorescent compounds fluorescing with a green to yellow hue.

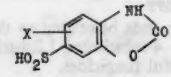
3,647,813
PROCESS FOR THE MANUFACTURE OF BENZOXAZOLONE-6-β-HYDROXY-ETHYL-SULFONE
Fritz Meininger, Frankfurt am Main, and Reinhard Hahnle, Hofheim, Taunus, Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt am Main, Germany
No Drawing. Filed Mar. 10, 1970, Ser. No. 18,281
Claims priority, application Germany, Mar. 14, 1969, P 19 12 954.5
Int. Cl. C07d *85/28*
U.S. Cl. 260—307 C **7 Claims**

A process for the manufacture of a benzoxazolone-6-β-hydroxyethylsulfone of the Formula II



(II)

in which X represents hydrogen, chlorine, bromine, lower alkyl or lower alkoxy, which comprises reacting 1 mol of a benzoxazolone-6-sulfinic acid of the Formula III



(III)

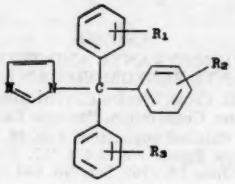
in which X is defined as above, with 1 to 10 mol of ethylene oxide in aqueous medium at a pH-range between about 2 and about 6 at a temperature range between about 10° C. and about 70° C.

3,647,814
METHOD FOR PREPARING 4-SUBSTITUTED-1,2,4-TRIAZOLES
Stanley A. Greenfield, Hatboro, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.
No Drawing. Filed July 3, 1969, Ser. No. 839,081
Int. Cl. C07d *55/06, 55/00, 99/10*
U.S. Cl. 260—308 R **4 Claims**

A method for preparing a 4-substituted-1,2,4-triazole which comprises reacting an N-alkoxymethylene-N'-formylhydrazine with a primary amine.

3,647,815
TRIPHENYLMETHYL IMIDAZOLES
Balthasar Hegedus, Bottmingen, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.
No Drawing. Filed Feb. 27, 1970, Ser. No. 15,259
Claims priority, application Switzerland, Mar. 12, 1969, 3,700/69
Int. Cl. C07d *49/36*
U.S. Cl. 260—309 **5 Claims**

Compounds represented by the formula



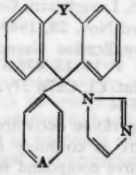
in which

R_1 is hydrogen, lower alkyl or halogen,

R_2 is phenyl and R_3 is hydrogen or phenyl, useful as antiprotozoal agents, along with methods of their preparation from the appropriate triphenylmethane and imidazole precursors as well as novel intermediates, are disclosed.

3,647,816
N-SUBSTITUTED IMIDAZOLES AND THEIR SALTS
Wilfried Draber, Karl-Heinz Buchel, and Manfred Plempel, Wuppertal-Elberfeld, Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany
No Drawing. Filed Nov. 12, 1969, Ser. No. 876,033
Claims priority, application Germany, Nov. 29, 1968, P 18 11 654.6
Int. Cl. C07d *49/36*
U.S. Cl. 260—309 **21 Claims**

Certain imidazoles and their salts having fungistatic properties are provided which have the following basic structure:



in which Y is $-(CH_2)_n-$, $-CH=CH-$, O or S; A is N or CH; and *n* is 0, 1 or 2. Typical fungi are trichophyton species, Microsporon species, Candida species and Penicillium species. These compounds are also active against pathogenic protozoa, viruses and bacteria.

3,647,817

REARRANGEMENT PROCESS FOR PREPARATION OF ALKYL 2 - BENZIMIDAZOLECARBAMATES FROM ALKYL 2 - AMINOBENZIMIDAZOLE-1-CARBOXYLATES

Bruce I. Dittmar, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

No Drawing. Filed Jan. 14, 1969, Ser. No. 791,181

Int. Cl. C07d *49/38*

U.S. Cl. 260—309.2 **4 Claims**

Alkyl 2 - aminobenzimidazole-1-carboxylates undergo a thermal rearrangement to the corresponding alkyl 2-benzimidazolecarbamate at temperatures between 110° C. and the melting point of the carbamate. The heating can be conducted in an inert solvent or without solvent.

The resulting alkyl 2-benzimidazolecarbamates are useful as fungicides and intermediates in the preparation of dialkyl esters of 2-carboxyaminobenzimidazole-1-carboxylic acids, which compounds are also fungicides.

3,647,818

1-(POLYHALOALKYLTHIO) INDAZOLES

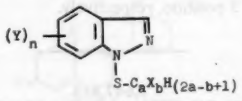
Joseph G. E. Fenyes, 8073 Hansom Drive, Oakland, Calif. 94605

No Drawing. Filed Sept. 15, 1966, Ser. No. 579,512

Int. Cl. C07d *49/18*

U.S. Cl. 260—310 C **6 Claims**

Indazoles of the formula:



wherein *a* is 1 or 2, *b* is 3 when *a* is 1 and is from 3 to 5 when *a* is 2, X is halogen of atomic number from 17 to 35 with at least one X being bonded to the carbon atom which is bonded to the sulfur atom, Y is halogen of atomic number from 17 to 35 or nitro in positions 4 to 6 of the indazole nucleus and *n* is an integer from 0 to 1. These compounds are fungicidal and bactericidal.

3,647,819

INDAZOLYLPHENYLUREAS AND INDAZOLYLPHENYLTHIOUREAS

Frederick K. Kirchner, Bethlehem, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

No Drawing. Filed Sept. 19, 1969, Ser. No. 859,569

Int. Cl. C07d *49/18*

U.S. Cl. 260—310 **14 Claims**

A series of indazolylphenylureas and indazolylphenylthioureas, useful for preventing and suppressing coccidiosis in poultry, are prepared by the condensation of an aminoindazole and a phenylisocyanate or a phenylisothiocyanate.

3,647,820

2-POSITION KETALS OF A-NORANDROSTANES AND DERIVATIVES THEREOF

Seymour D. Levine, North Brunswick, and Patrick A. Diassi, Westfield, N.J., assignors to E. R. Squibb & Sons, Inc., New York, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 792,235, Jan. 16, 1969, which is a division of application Ser. No. 621,755, Mar. 9, 1967, now Patent No. 3,468,955, which in turn is a division of application Ser. No. 440,311, Mar. 16, 1965, now Patent No. 3,330,851. This application Apr. 13, 1970, Ser. No. 28,046

Int. Cl. C07d *13/04*

U.S. Cl. 260—340.9 **9 Claims**

This invention relates to new 2-ketal derivatives of A-norandrostane which are useful in the preparation of cyano-containing androstanes having fertility inhibiting activity.

3,647,821

SUBSTITUTED NAPHTHOFURAN COMPOUNDS

Marinus Los, Edinburg, Scotland, assignor to American Cyanamid Company, Stamford, Conn.

No Drawing. Continuation-in-part of application Ser. No. 708,498, Feb. 27, 1968. This application June 17, 1970, Ser. No. 47,107

Int. Cl. C07d *5/34*

U.S. Cl. 260—340.9 **7 Claims**

This invention relates to substituted naphtho[2,1-b] furans useful in the synthesis of D-homosteroids. The latter steroids are useful as estrogenic agents in the treatment of laboratory and domestic animals.

3,647,822

CERTAIN PEROXY-CONTAINING 2-OXO-TETRAHYDROFURANS

Yun Ger Chang, Austin, Tex., assignor to Reichhold Chemicals, Inc., White Plains, N.Y.

No Drawing. Filed Sept. 5, 1968, Ser. No. 757,758

Int. Cl. C07d *5/06*

U.S. Cl. 260—343.6 **5 Claims**

A difunctional hydroperoxide is reacted with either a γ-ketoacylhalide or a 2-aroylbenzoylhalide, in the presence of a basic reagent in an organic solvent like p-dioxane at a temperature ranging from about 10° C. to about 50° C. at a mole ratio from about 1:2 to about 1:10. The preferred temperature is between about 25° C. and 35° C. and the preferred ratio is from about 1:2 to about 1:2.5.

3,647,823

OXA-POLYCYCLIC DIOLS AND PROCESS FOR PREPARING THE SAME

Arsene Isard, St. Genis Laval, and Francis Weiss, Pierre Benite, France, assignors to Ugine Kuhlmann, Paris, France

No Drawing. Filed Jan. 4, 1968, Ser. No. 695,572

Claims priority, application France, Jan. 6, 1967, 90,194

Int. Cl. C07d *5/04*

U.S. Cl. 260—347.8 **9 Claims**

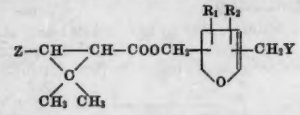
4-hydroxy-1-methylol-6-oxa (3.2.1)-bicyclo-octane, 4-hydroxy - 1 - methylol-6-oxa (3.2.1.$1^{3,8}$)-tricyclo-nonane, and 4-hydroxy-1-methylol-6,8-dioxa (3.2.1)-bicyclo-octane are prepared by reacting in the presence of a catalyst such as tungstic acid, a peracid with a cyclic diol such as 1,1 - dimethylol-3-cyclohexene, 2,2-dimethylol-5-norbornene, 2,2-dimethylol-3,4-dihydro (2H) pyrane. The peracid may be prepared in situ by reacting hydrogen peroxide with a carboxylic acid.

3,647,824
SUBSTITUTED FUROIC ACIDS AND ESTERS THEREOF

Michael Elliott, Harpenden, England, assignor to National Research Development Corporation, London, England

No Drawing. Division of application Ser. No. 807,406, Mar. 14, 1969, now Patent No. 3,542,928, which is a division of application Ser. No. 598,923, Dec. 5, 1966, now Patent No. 3,465,007. Divided and this application Sept. 17, 1969, Ser. No. 870,779
Int. Cl. C07d 5/28, 5/16
U.S. Cl. 260—347.5 3 Claims

Insecticidal compositions are produced wherein the active ingredient is at least one compound of the formula



in which Z represents an aryl, alkenyl or carboalkoxyalkenyl group, Y represents a hydrogen atom or an alkyl, alkenyl or alkadienyl group or an aryl group or a heterocyclic group which themselves may be substituted by alkyl, alkenyl, alkadienyl or alkoxy groups or halogen atoms, and R_1 and R_2 which may be the same or different, each represent a hydrogen atom or an alkyl, alkenyl or alkadienyl group. Furoic acids and furoic acid lower alkyl esters are also disclosed.

3,647,825
METHOD OF MAKING AND USING 4-HYDROXY-5-METHYL-2,3-DIHYDROFURAN-3-ONE

Hideo Shimazaki, Tokyo, Shuji Tsukamoto and Tadaomi Saito, Kanagawa-ken, Sadanari Eguchi, Miyagi-ken, and Yasushi Komata, Tokyo, Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

No Drawing. Continuation-in-part of application Ser. No. 712,397, Mar. 12, 1968. This application Dec. 29, 1969, Ser. No. 888,951
Claims priority, application Japan, Mar. 15, 1967, 42/16,265; Apr. 15, 1967, 42/23,921
Int. Cl. C07d 5/10
U.S. Cl. 260—347.8 1 Claim

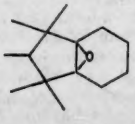
4-hydroxy-5-methyl-2,3-dihydrofuran-3-one is produced by Maillard reaction between xylose, ribose or arabinose with glutamic acid, aspartic acid, alanine, glycine, proline or salts of these amino acids, and may be recovered in crystalline form from the reaction mixture by steam distillation, evaporation of the distillate at temperatures not higher than 40° C., and sublimation from the oily residue at or above 80° C. The compound imparts a pleasant maltol-like flavor to ingestible products such as food, drinks, but also compositions for oral hygiene. The crude Maillard reaction mixture containing the compound may be employed as a flavoring if prepared from glutamic acid, aspartic acid or their salts and from xylose or xylan.

3,647,826
INDANE DERIVATIVES

John B. Hall, Oakhurst, N.J., assignor to International Flavors & Fragrances Inc., New York, N.Y.

No Drawing. Filed Aug. 18, 1969, Ser. No. 851,090
Int. Cl. C07d 1/00
U.S. Cl. 260—348 C 1 Claim

Saturated epoxyindane derivative having the formula



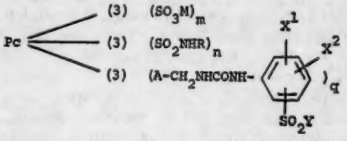
perfume compositions containing such epoxyindane and processes for producing same.

3,647,827
REACTIVE PHTHALOCYANATE DYES CONTAINING AN ARYLUREAMETHYLENE GROUP

Hiroshi Sigiyama, Ashiya-shi, Takuo Ikeda, Ibaragi-shi, and Takashi Itani, Sakai-shi, Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

No Drawing. Filed Dec. 8, 1967, Ser. No. 688,959
Claims priority, application Japan, Dec. 10, 1966, 41/81,194
Int. Cl. C09b 1/30, 62/72; D06p 1/38
U.S. Cl. 260—372 2 Claims

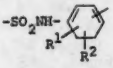
A dye suitable for dyeing cellulosic materials such as cotton, nitrogen-containing fibers such as wool and polyvinyl alcohol fibers, which has the formula,



wherein Pc is a copper or nickel phthalocyanine nucleus; X^1 and X^2 each represent hydrogen, methyl or methoxy; M is hydrogen, an alkali metal or an alkaline earth metal; Y is $—CH_2CH_2OSO_3M$ or $—CH=CH_2$ and the $—SO_2Y$ group is bonded with the phenyl group at a 3- or 4-position to the ureido group; R is hydrogen or

$$—CH_2CH_2OSO_3M$$

A is $—SO_2NH—$ or



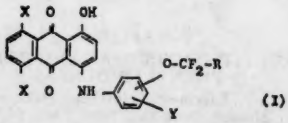
(R^1 and R^2 each represent hydrogen, sulfo or methyl); m is 0 to 3; n is 0 to 2; and q is 1 to 4, wherein $m+n+q$ is 3 or 4, and when q is 2 to 4, the A's may be the same or different, and $—SO_3M$, $—SO_2NHR$ and —A— groups are all bonded to four phenyl nucleuses in said phthalocyanine at a 3-position, respectively.

3,647,828
DYESTUFFS OF THE ANTHRAQUINONE SERIES

Ernst Spietschka, Oberauroff, and Friedrich Ische, Kelkheim, Taunus, Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt am Main, Germany

No Drawing. Filed June 3, 1970, Ser. No. 43,239
Claims priority, application Germany, June 11, 1969, P 19 29 564.8
Int. Cl. C09b 1/50
U.S. Cl. 260—380 7 Claims

Dyestuffs of the general formula



(I)

in which the one X is hydroxy and the other X is nitro or amino or alkylamino optionally substituted by halogen, hydroxy, alkoxy, or cyano, R is fluorine or alkyl optionally substituted by fluorine and/or chlorine, and Y is hydrogen, halogen, alkyl or alkoxy optionally substituted by fluorine or hydroxy, the dyestuffs being suitable for dyeing, coloring or printing polyester material.

3,647,829

PROCESS FOR THE PREPARATION OF 3α-HYDROXY-5β-PREGNAN-20-ONE

Gunther Kruger, St. Laurent, Quebec, Canada, assignor to Steele Chemicals Company Limited, Ville St. Pierre, Quebec, Canada

No Drawing. Filed Dec. 2, 1969, Ser. No. 881,604
Claims priority, application Canada, Nov. 5, 1969, 066,775
Int. Cl. C07c *169/32*
U.S. Cl. 260—397.4 11 Claims

Process for the preparation of 3α-hydroxy-5β-pregnan-20-one by the selective hydrogenation of a member selected from the group consisting of the Δ^4-3-ketosteroids progesterone, spirost-4-en-3-one and stigmasta-4,22-dien-3-one to form the corresponding 3-keto-5β-setroids, followed by the selective reduction of the latter ketone to the corresponding 3α-hydroxy-5β-steroid. When progesterone is used as the starting material, the desired product, 3α-hydroxy-5β-pregnan-20-one, is obtained directly; when spirost-4-en-3-one, or stigmasta-4,22-dien-3-one is used as the starting material, the desired product is obtained by subsequent degradation of side chain attached to the D-ring of the steroid nucleus. The process is very economical and results in high yields of the end product.

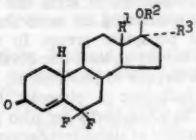
3,647,830

6,6 - DIFLUORO-13β-ETHYL-17α-SUBSTITUTED-17β-HYDROXY - 4 - GONEN - 3-ONES AND THEIR LOWER ESTERS

George A. Boswell, Jr., Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

No Drawing. Continuation-in-part of application Ser. No. 720,493, Apr. 11, 1968, now Patent No. 3,511,861. This application Jan. 22, 1970, Ser. No. 5,139
Int. Cl. C07c *169/20*
U.S. Cl. 260—397.4 8 Claims

Described are steroid compounds of the formula



in which

R^1 is ethyl, propyl, or isopropyl;
R^2 is hydrogen, the acetyl group, or the propionyl group;
R^3 is —CH≡CH, —C≡CCF$_3$, —CH=CH$_2$, —C≡CCH$_3$, —CH$_2$CH$_3$, —CH=CHCH$_3$, or —CH$_2$CH$_2$CH$_3$.

These compounds are highly active progestational agents.

3,647,831

PROCESSES FOR PREPARING EQUILENIN COMPOUNDS

Robert Ginsig, Cuernavaca, Morelos, Mexico, assignor to Syntex Corporation, Panama, Panama

No Drawing. Filed Feb. 26, 1970, Ser. No. 14,625
Int. Cl. C07c *169/08*
U.S. Cl. 260—397.45 13 Claims

Methods of synthesizing equilenin compounds from the corresponding natural or synthetic equilin compounds. The methods are characterized by the steps of (1) epoxidizing an equilin compound to the corresponding 7,8-epoxy saturated B ring compound and, (2) cleaving the epoxy ring and concomitantly introducing the equilenin B ring aromatization.

3,647,832

RUTHENIUM COMPLEXES AND PROCESSES FOR THEIR PREPARATION

Pierre Chabardes and Louis Colevray, Lyon, France, assignors to Rhone-Poulenc S.A., Paris, France

No Drawing. Filed Mar. 18, 1968, Ser. No. 714,010
Claims priority, application France, Mar. 23, 1967, 100,058; Apr. 11, 1967, 102,292; June 29, 1967, 112,456; Dec. 11, 1967, 131,753
Int. Cl. C07f *15/00*
U.S. Cl. 260—429 J 14 Claims

The invention provides new ruthenium complexes of the formula:

$$[Ru(Diket)_2(CO)_xL_y]_z$$

in which Diket is a β-diketone residue, L is a mono- or poly-dentate ligand residue other than a β-diketone, x and z are positive integers, y is zero or a positive integer and $x+y+z=3$, which are useful as ruthenium catalysts, e.g. in the dimerization or hydrodimerization of acrylonitrile.

3,647,833

TRICYCLOHEXYLTIN HALIDE PROCESS

Gerald H. Reifenberg, Hightstown, and William J. Considine, Somerset, N.J., assignors to M & T Chemicals Inc., New York, N.Y.

No Drawing. Original application Nov. 4, 1968, Ser. No. 773,331, now Patent No. 3,564,033, dated Feb. 16, 1971. Divided and this application May 15, 1970, Ser. No. 48,659
Int. Cl. C07f *7/22*
U.S. Cl. 260—429.7 3 Claims

The process of this invention for preparing tricyclohexyltin halide $(C_6H_{11})_3SnX$ wherein X is selected from the group consisting of chloride and bromide, comprises reacting tricyclohexylphenyltin and tin tetrahalide.

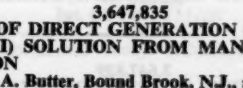
3,647,834

ZINC MERCAPTIDE N-ACETYLCYSTEINE CARBOXYLATE SALTS

Tellis A. Martin, Evanston, Ind., assignor to Mead Johnson & Company, Evansville, Ind.

No Drawing. Filed Aug. 11, 1969, Ser. No. 849,150
Int. Cl. C07f *3/06*
U.S. Cl. 260—429.9 14 Claims

Zinc mercaptide N-acetylcysteine carboxylate salts of Formula I wherein M represents one chemical equivalent of a pharmaceutically acceptable salt forming cation relative to said carboxylate are prepared by reaction of the carboxylate with zinc carbonate or zinc oxide. These substances are substantially odorless and tasteless.



Formula I

3,647,835

METHOD OF DIRECT GENERATION OF MANGANESE (III) SOLUTION FROM MANGANESE (II) SOLUTION

Stephen A. Butter, Bound Brook, N.J., assignor to Mobil Oil Corporation

No Drawing. Filed Nov. 12, 1969, Ser. No. 876,136
Int. Cl. C07c *11/26;* C07d *103/00*
U.S. Cl. 260—429 R 11 Claims

A method in which an aqueous manganese (II) solution is treated with a tertiary amine or ammonia in a free oxygen-containing atmosphere results in manganese (II) oxide or manganese (II) hydroxide precipitation which, in situ, is rapidly oxidized to manganese (III) oxide from which, upon treatment with a suitable acid, particularly an aliphatic carboxylic acid, the manganese (III) salt of said acid is obtained. The compounds are useful as catalysts for the synthesis of lactones from olefins.

3,647,836

N-BROMO-N-CHLORO-SULFAMYL BENZOIC ACIDS AND SALTS THEREOF

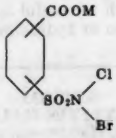
Laurence O. Paterson, Adrian, Mich., assignor to Drug Research, Inc., Adrian, Mich.

No Drawing. Application Aug. 24, 1965, Ser. No. 482,256, which is a continuation-in-part of applications Ser. No. 119,756, Apr. 7, 1961, Ser. No. 143,565, Oct. 9, 1961, Ser. No. 593,047, June 22, 1956, now Patent No. 3,147,259, Ser. No. 126,403, June 14, 1961, now Patent No. 3,147,219, and Ser. No. 674,362, May 22, 1967. Divided and this application June 17, 1970, Ser. No. 47,121

Int. Cl. C07f 7/22, 3/02, 3/04

U.S. Cl. 260—429.7 13 Claims

N-bromo-N-chloro-sulfamyl benzoic acids are provided having the formula:



in which M is hydrogen or a metallic cation. These compounds have biocidal and disinfectant properties.

3,647,837

SYNTHESIS OF ORGANOLEAD COMPOUNDS

Kenneth C. Williams, Baton Rouge, La., assignor to Ethyl Corporation, New York, N.Y.

No Drawing. Filed Feb. 9, 1970, Ser. No. 9,984

Int. Cl. C07f 7/24

U.S. Cl. 260—437 R 12 Claims

A method of making organolead compounds and particularly the synthesis of tetraneopentyllead and hexaneopentyldilead from an inorganic lead (II) salt, and the use of said lead compounds for decreasing knock in internal combustion engines.

3,647,838

METHOD OF MAKING TETRAORGANOLEAD COMPOUNDS

Kenneth C. Williams and Wilford H. Thomas, Baton Rouge, La., assignors to Ethyl Corporation, New York, N.Y.

Filed May 15, 1969, Ser. No. 824,765

Int. Cl. C07f 7/24

U.S. Cl. 260—437 R 16 Claims

A method of making tetraorganolead compounds comprising reacting an organo halide with a magnesium-lead alloy or a magnesium-sodium-lead in the presence of cycloalkylene monoether catalyst and/or solvent having a five-member ring, e.g., tetrahydrofuran.

3,647,839

SYNTHESIS OF TETRAMETHYLLEAD

Ronald S. Bartlett, Corpus Christi, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

No Drawing. Filed Nov. 20, 1969, Ser. No. 878,550

Int. Cl. C07f 7/241

U.S. Cl. 260—437 R 12 Claims

A process is described for the preparation of tetramethyllead which involves reacting methyl chloride and sodium-lead alloy together in the presence of a catalyst involving a lithium-aluminum alloy. The alloy is described as containing at least 30 percent by weight lithium, preferably 50 percent by weight. The temperatures of operation described are typically from 90 to 150° C.

3,647,840

CUPROUS SULFONATE SALT COMPLEXES

James L. Bills, Provo, Utah, assignor to Monsanto Company, St. Louis, Mo.

No Drawing. Filed Feb. 10, 1970, Ser. No. 10,310

Int. Cl. C07f 1/08

U.S. Cl. 260—438.1 13 Claims

Cuprous sulfonate salt complexes comprise: (a) a cuprous sulfonate salt having the formula RSO_3Cu wherein R is an organic radical containing 1 to 20 carbon atoms and having substituents which are hydrogen, chlorine, fluorine and combinations thereof; and (b) an organic complexing agent which is an aromatic hydrocarbon, an olefin hydrocarbon, a nitrile, a nitro-alkyl, a nitro-aryl, a sulfone or combination thereof. These cuprous sulfonate salt complexes have surface active properties rendering them useful as surface tension reducing agents, wetting agents, dispersing agents and emulsifying agents. These cuprous salt complexes are also useful for removing carbon monoxide impurities from gaseous streams.

3,647,841

NICKEL ORGANOPHOSPHITES

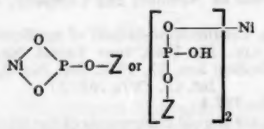
Otto S. Kauder, Jamaica, N.Y., assignor to Argus Chemical Corporation, Brooklyn, N.Y.

No Drawing. Original application Sept. 15, 1965, Ser. No. 487,614, now Patent No. 3,395,112, dated July 30, 1968. Divided and this application Jan. 25, 1968, Ser. No. 718,281

Int. Cl. C07f 15/04; C08f 45/62

U.S. Cl. 260—439 8 Claims

Nickel organophosphites are provided which have the formula



wherein Z is a monovalent or polyvalent organic radical having from one to about thirty carbon atoms, the nickel organophosphite containing at least one organic radical per molecule, but containing no more than one such organic radical per phosphite group. In addition, nickel organophosphites having at least one bivalent nickel atom ionically linked to oxygen to phosphorus, and at least one organic radical including a phenolic hydroxyl group linked to oxygen to phosphorus are also provided. These compounds have utility as stabilizers for polyolefins.

3,647,842

STABILIZATION OF COBALT CARBONYL COMPOUNDS BY OXYGEN-DENTATED LIGANDS

John B. Wilkes, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.

No Drawing. Filed Mar. 20, 1969, Ser. No. 809,028

Int. Cl. C07f 15/06; C07c 45/02

U.S. Cl. 260—439 R 7 Claims

At a temperature in the range 100° C. to 225° C. the destructive dissociation of cobalt carbonyl compounds to cobalt metal and residue is inhibited by the action of oxygen-dentated chelation ligands.

3,647,843

ACETYLENE-CUPROUS ALUMINUM TETRACHLORIDE COMPLEX AND A PROCESS FOR ITS PRODUCTION

David G. Walker, Baytown, and Donald A. Keyworth, Houston, Tex., assignors to Tenneco Chemicals, Inc.

Filed Nov. 20, 1969, Ser. No. 878,356

Int. Cl. C07f 1/08

U.S. Cl. 260—438.1 8 Claims

Acetylene reacts with cuprous aluminum tetrachloride under ambient conditions to form a stable complex that

is soluble in aromatic hydrocarbons. Since acetylene can be readily recovered from them, solutions containing the acetylene-cuprous aluminum tetrachloride are useful as a storage, transport, or reaction medium for acetylene.

3,647,844
PROCESS FOR THE PRODUCTION OF TETRAALKYL LEAD

Nikolai Vasilievich Komarov, Ulitsa Lemontova 315, kv. 32, and Tatyana Ivanovna Ermolova, Ulitsa Bograda 1, kv. 22, both of Irkutsk, U.S.S.R.

No Drawing. Filed July 29, 1969, Ser. No. 845,873
Int. Cl. C07f 7/24
U.S. Cl. 260—437 R 6 Claims

Production of tetraalkyl lead by reaction of alkyl halide with lead-sodium alloy in polar aprotic solvents such as tetrahydrofuran and dimethyl formamide. The temperature of reaction ranges from 20–60° C., the pressure ranges from 1–2 atm. and the ratio of alkyl halide to alloy is 1:1. The solvent and final product are distilled off in a vacuum in a stream of nitrogen.

3,647,845
STABILIZATION OF COBALT CARBONYL COMPOUNDS BY AZOXY-DENTATED LIGANDS

John B. Wilkes, 2935 Oxford Ave., Richmond, Calif. 94806

No Drawing. Filed Sept. 12, 1969, Ser. No. 857,547
Int. Cl. C07c 45/02; C07f 15/06
U.S. Cl. 260—439 R 9 Claims

At a temperature in the range of 100° C. to 225° C. the destructive dissociation of cobalt carbonyl compounds to cobalt metal and residue is inhibited by the action of one or more azoxy-dentated chelation ligands.

3,647,846
METHOD FOR PROMOTING THE REACTION BETWEEN A SILICON-BONDED HYDROXYL RADICAL AND A SILICON-BONDED ALKOXY RADICAL

Robert C. Hartlein, Midland, and Carl R. Olson, Freeland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

No Drawing. Filed Dec. 1, 1969, Ser. No. 881,287
Int. Cl. C07f 7/08
U.S. Cl. 260—448.2 E 11 Claims

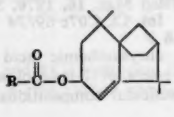
Silicon-bonded hydroxyl radicals will react rapidly and completely in the presence of an organotitanate and an organic amine when the titanate and the amine are not premixed or added simultaneously. This method is useful in the preparation of compounds and polymers having Si—O—Si bonds.

3,647,847
ISOLONGIFOLENE ESTERS

Anthony John Curtis, Ilford, Brian George Jaggers, Romford, and John Francis Janes, Epping, England, assignors to Bush Boake Allen Limited, London, England

Filed Sept. 24, 1969, Ser. No. 860,638
Claims priority, application Great Britain, Sept. 27, 1968, 46,056/68
Int. Cl. C07c 69/14, 69/24
U.S. Cl. 260—489 2 Claims

Novel isolongifolene esters of the formula:



wherein R is a C_1–C_3 alkyl group are prepared by allylic substitution, e.g. oxidation, of isolongifolene, followed by replacement of the substituent by an RCO_2— group. Said esters have valuable perfumery properties particularly as replacements for vetiverol derivatives.

3,647,848
BIURET DIISOCYANATES

Kuno Wagner, Leverkusen, and Gerhard Mennicken, Opladen, Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

No Drawing. Filed Sept. 16, 1968, Ser. No. 760,085
Claims priority, application Germany, Sept. 18, 1967, P 17 20 711.3
Int. Cl. C07c 119/04; C08g 22/24, 22/44
U.S. Cl. 260—453 AB 1 Claim

Stabilized polyurethanes prepared by reacting polyisocyanates with compounds containing at least two reactive hydrogen atoms as determinable by the Zerewitinoff method wherein the polyisocyanate reactant is an aliphatic, cycloaliphatic or araliphatic polyisocyanate or an isocyanurate of an aliphatic, cycloaliphatic or araliphatic polyisocyanate with aromatic polyisocyanates, which polyisocyanate reactant contains an asymmetric dialkyl substituted semicarbazide, carbazic ester or carboxylic acid hydrazide group and at least one biuret, urethane, acylated urea or acylated isocyanurate group in the molecule.

3,647,849
PRODUCTION OF ALKYL THIOCYANATES

James T. Venerable, Huntley, James Miyashiro, Woodstock, and Alfred W. Seiling, Crystal Lake, Ill., assignors to Morton International, Inc., Chicago, Ill.

Continuation-in-part of application Ser. No. 458,559, May 25, 1965. This application Jan. 17, 1968, Ser. No. 704,973
Int. Cl. C07c 161/02
U.S. Cl. 260—454 11 Claims

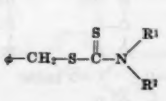
A process for preparing lower alkyl thiocyanates which comprises reacting a thiocyanate with a lower alkyl halide in an aqueous medium under elevated temperature and pressure conditions.

3,647,850
FLUORINE SUBSTITUTED BENZYL DITHIOCARBAMATES AND THEIR PRODUCTION AND USE

Hiroshi Ono, Koga-gun, Shiga-ken, and Toshikazu Higuchi, Matsubara-shi, Japan, assignors to Daikin Kogyo Co., Ltd., Osaka-shi, Osaka-fu, Japan

No Drawing. Filed July 26, 1968, Ser. No. 747,836
Claims priority, application Japan, July 26, 1967, 42/47,989
Int. Cl. C07c 155/08
U.S. Cl. 260—455 A 6 Claims

Fluorine substituted benzyl dithiocarbamates of the formula:



wherein ϕ is a fluorophenyl group and R^1 and R^2 are each a hydrogen atom, an alkyl group having 1 to 4 carbon atoms or an alkenyl group having 3 or 4 carbon atoms, having herbicidal activity against monocotyledonous and dicotyledonous weeds without any material chemical injury on crop plants.

3,647,851

SECONDARY ALCOHOL SULFATION PROCESS IN THE PRESENCE OF INORGANIC SALTS

John B. Wilkes, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.

No Drawing. Filed June 29, 1967, Ser. No. 649,839
Int. Cl. C07c *141/04*
U.S. Cl. 260—459 13 Claims

By the addition of certain finely divided salts to a chlorosulfonic acid-secondary alcohol sulfation mixture, side reactions are inhibited.

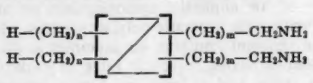
3,647,852

CARBONATES OF ETHER AND HYDROXY SUBSTITUTED FATTY AMINES

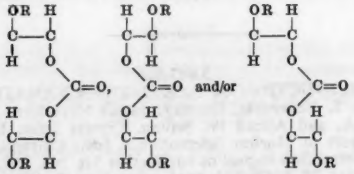
Marwan R. Kamal, Dhahran, Saudi Arabia, and Robert C. Kuder, Excelsior, Minn., assignors to General Mills, Inc.

No Drawing. Filed Apr. 25, 1969, Ser. No. 819,441
Int. Cl. C07c *93/16;* C08g *22/20*
U.S. Cl. 260—463 10 Claims

Ether carbonate diamines of the formula:



where Z is



where *n* is 4 to 19, *m* is 0 to 15, the sum of *n* and *m* is 13 to 19, and R is a monovalent organic radical. Diisocyanates derived therefrom with the same being useful for preparing polymers.

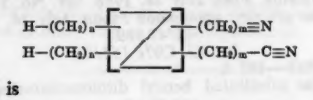
3,647,853

CARBONATES OF ETHER AND HYDROXY SUBSTITUTED FATTY NITRILES

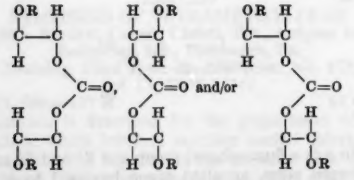
Marwan R. Kamal, Dhahran, Saudi Arabia, and Robert C. Kuder, Excelsior, Minn., assignors to General Mills, Inc.

No Drawing. Filed Apr. 25, 1969, Ser. No. 819,442
Int. Cl. C07c *12/34;* C08g *22/20*
U.S. Cl. 260—463 10 Claims

Ether carbonate dinitriles of the formula:



where Z is



where *n* is 4 to 19, *m* is 0 to 15, the sum of *n* and *m* is 13 to 19 and R is a monovalent organic radical. Diamines and diisocyanates derived therefrom with the latter being useful for preparing polymers.

3,647,854

PRODUCTION OF CYANOACETALDEHYDE

Hans Juergen Sturm and Herbert Armbrust, Grunstadt, Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

No Drawing. Filed Apr. 20, 1970, Ser. No. 30,287
Claims priority, application Germany, Apr. 22, 1969, P 19 20 246.1
Int. Cl. C07c *121/34*
U.S. Cl. 260—465.1 6 Claims

Production of cyanoacetaldehyde by splitting isoxazolines in the presence of inorganic bases. The product is a valuable intermediate in the manufacture of dyes and pesticides.

3,647,855

PURIFICATION OF ADIPONITRILE CONTAINING FRACTIONS

Maomi Seko, Tokyo, and Yasunobu Takahashi, Takeaki Iwamoto, and Shikazo Seno, Miyazaki-ken, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

No Drawing. Filed Feb. 25, 1969, Ser. No. 802,254
Claims priority, application Japan, Feb. 29, 1968, 43/13,071; Aug. 31, 1968, 43/62,196
Int. Cl. C07g *121/26*
U.S. Cl. 260—465.8 18 Claims

Purification of crude adiponitrile containing acrylonitrile, propionitrile, hydroxypropionitrile and bis-cyanoethyl ether (BCE) by decomposing the BCE by treating the crude at about 0 to 400° C. in the presence of preferably about 0.001 to 0.1 mole of a polyvalent metal catalyst in a valence state of at least 3 per mole of BCE. The metal catalyst is at least one compound of chromium, manganese, molybdenum, tungsten, and/or rhenium. The metal catalyst may be an oxide or alkali metal, alkaline earth metal, or ammonium compounds containing as the anionic portion thereof an oxygen-polyvalent metal moiety where the polyvalent metal is as stated above. Suitable anions include chromates, manganates, etc.; bichromates, permanganates, etc.; monosubstituted chromic sulfate, monosubstituted manganic sulfate, etc.

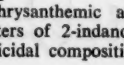
3,647,856

SULFINYL YLIDS

Alden Dwayne Josey, New Castle County, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

No Drawing. Filed Dec. 8, 1967, Ser. No. 688,958
Int. Cl. C07c *145/00*
U.S. Cl. 260—465 U 7 Claims

Sulfinyl ylids which are useful as acid scavengers having the formula



in which R and R′ are hydrocarbon groups or hydrocarbon groups with inert substituents and Z is nitrogen or carbon joined to an electron withdrawing group can be made by reacting the appropriate sulfinyl chloride with a compound $R'_3P{=}ZH$ in the presence of an acid acceptor inert to RSOCl.

3,647,857

NOVEL ESTERS OF CHRYSANTHEMIC ACID AND ALCOHOLS RELATED TO 2-INDANOL

John W. Morgan, Springfield Township, Hamilton County, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

No Drawing. Filed Mar. 16, 1970, Ser. No. 20,127
Int. Cl. C07c *69/74*
U.S. Cl. 260—468 P 7 Claims

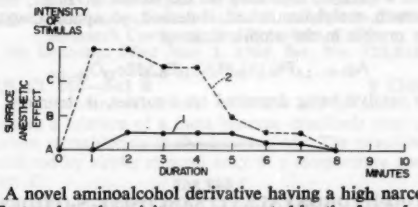
Described are chrysanthemic acid (chrysanthemum carboxylic acid) esters of 2-indanol and substituted 2-indanols, and insecticidal compositions containing same.

These esters possess unique insecticidal properties and are useful as such in home, garden and agricultural applications.

3,647,858
PROCESS FOR PREPARING 1-BENZYLIDENE-3-INDENYL ACETIC ACIDS
David F. Hinkley, Plainfield, and John B. Conn, Westfield, N.J., assignors to Merck & Co., Inc., Rahway, N.J.
No Drawing. Continuation-in-part of application Ser. No. 878,210, Nov. 19, 1969. This application May 1, 1970, Ser. No. 33,977
Int. Cl. C07c *143/52*
U.S. Cl. 260—470 **3 Claims**

Process for preparing 1-benzylidene-3-indenyl acetic acids by condensing a benzylphenyl ketone. Also included are novel diphenylbutyrates and diphenylcaproates.

3,647,859
AMINOALCOHOL DERIVATIVES
Haruo Ogura, 130 Shirokane Sankocho, Shiba, Tokyo, Japan
Filed Apr. 23, 1968, Ser. No. 723,506
Claims priority, application Japan, Apr. 29, 1967, 42/27,490, 42/27,491
Int. Cl. C07c *93/16, 93/24*
U.S. Cl. 260—473 R **2 Claims**



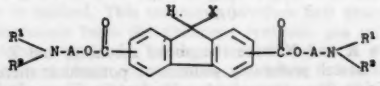
A novel aminoalcohol derivative having a high narcotic effect and weak toxicity, as represented by the formula:

$$R_1\text{—}\underset{R_2}{CH}\text{—}\underset{R_3}{CH}\text{—}OCO\text{—}R_4$$

wherein R_1 represents either a cyclohexylamino group or diethylaminoethylamino group; R_2 and R_3 represent dissimilar radicals selected from the group consisting of a methyl group and hydrogen; and R_4 represents either a phenyl group, methoxyphenyl group, or ethoxyphenyl group, but when R_1 is a cyclohexylamino group and R_2 is a hydrogen atom, R_4 represents either a methoxyphenyl group or ethoxyphenyl group, and a process for preparing the same by subjecting cyclohexylamine or diethylaminoethylamine to reaction with propylene oxide to form an aminoalcohol and then benzoylating the resulting aminoalcohol.

3,647,860
FLUORENE BIS-BASIC ESTERS
Arthur D. Sill and Robert W. Fleming, Cincinnati, Ohio, assignors to Richardson-Merrell Inc., New York, N.Y.
No Drawing. Filed Jan. 9, 1969, Ser. No. 790,171
Int. Cl. C07c *69/76*
U.S. Cl. 260—475 FR **8 Claims**

Novel fluorene and fluorenol bis-basic ester compounds, their method of preparation and use as antiviral agents. The compounds are of the formula



wherein:

(A) each of R^1 and R^2 is hydrogen, (lower) alkyl, cycloalkyl of 3 to 6 ring carbon atoms, alkenyl of 3 to 6 carbon atoms or each set of R^1 and R^2 taken together with the nitrogen to which they are attached is pyrrolidino, piperidino, N - (lower)alkylpiperazino or morpholino;

(B) each A is alkylene of 2 to about 8 carbon atoms and separates its adjacent oxygen and nitrogen atoms by an alkylene chain of at least 2 carbon atoms; and

(C) X is H or OH; or a pharmaceutically acceptable acid addition salt thereof.

3,647,861
SUBSTITUTED O-CARBAMYLHYDROXAMATES
James B. Buchanan, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
No Drawing. Division of application Ser. No. 670,494, Aug. 31, 1967, now Patent No. 3,576,834, which is a continuation-in-part of application Ser. No. 602,134, Dec. 16, 1966, which in turn is a continuation-in-part of application Ser. No. 361,277, Apr. 20, 1964. This application Aug. 25, 1970, Ser. No. 66,876
Int. Cl. C07c *149/20*
U.S. Cl. 260—481 R **4 Claims**

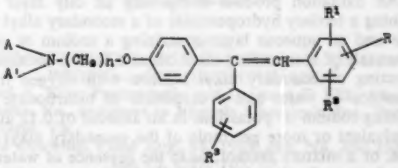
Substituted O-carbamylhydroxamates such as methyl O-(methylcarbamyl)thiolacetohydroxamate useful as pesticides.

3,647,862
PREPARATION OF VINYL ESTER-TOLUENE TELOMERS
Joseph K. Hoffman, Oldwick, and James P. Russell, Berkeley Heights, N.J., assignors to Air Products and Chemicals, Inc., Allentown, Pa.
Original application July 31, 1964, Ser. No. 386,593. Divided and this application Dec. 22, 1969, Ser. No. 887,025
Int. Cl. C07c *67/00, 69/16, 69/22*
U.S. Cl. 260—491 **2 Claims**

Telomers of vinyl esters of lower alkanoic acids, such as vinyl acetate, wherein the telogen is toluene, are produced by reacting the vinyl ester with the telogen at a temperature of 90° to 250° C. and at a pressure of 50 to 7500 p.s.i. in the presence of a free-radical forming catalyst or initiator effective for the polymerization of vinyl acetate, the vinyl ester and the telogen having a residence time in the reaction of 0.5 to 60 minutes, preferably 1 to 10 minutes.

3,647,863
AMINOALKOXY-TRIPHENYL ETHYLENES AND THE SALTS THEREOF
Frank P. Palopoli, Glenside, Pa., and Thomas R. Blohm and Takashi Kariya, Cincinnati, Ohio, assignors to Richardson-Merrell Inc., New York, N.Y.
No Drawing. Filed Nov. 25, 1968, Ser. No. 778,782
Int. Cl. C07c *93/08*
U.S. Cl. 260—501.18 **5 Claims**

Novel compounds of the formula:



wherein:

(A) each of A and A' is hydrogen or (lower) alkyl or A and A' taken together with the nitrogen to which

they are attached is piperidino, morpholino, pyrrolidino or 4-methylpiperazino;
(B) (*n*) is an integer of 2 to 4;
(C) each of R^1, R^2 and R^3 is hydrogen or methyl; and
(D) R is in the para- or a meta-position of the ring and is cycloalkyl of 5 to 8 ring carbon atoms or alkyl of 4 to 8 carbon atoms; or a pharmaceutically acceptable acid addition salt thereof.

3,647,864
5-SUBSTITUTED-1,3-BENZENEDIACRYLIC AND -DIPROPIONIC ACIDS
James H. Ackerman, Bethlehem, N.Y., assignor to Sterling Drug Inc., New York, N.Y.
No Drawing. Filed Nov. 16, 1967, Ser. No. 683,455
Int. Cl. C07c *79/46, 101/44*
U.S. Cl. 260—515 P **8 Claims**

5 - amino- or 5 - hydroxy-2,4,6-triiodo-1,3-benzenediacrylic and -dipropionic acids, optionally substituted by lower-alkyl or phenyl in the α- and α′-positions, are prepared by iodination of the appropriate 5-amino- or 5-hydroxy-1,3-benzenediacrylic or -dipropionic acids; and the 5-amino and 5-hydroxy groups are further substituted by acyl and alkyl groups. The iodinated compounds are useful as intravenous cholecystographic agents.

3,647,865
α-IMINO-2-TOLUIC ACIDS
Theodore S. Sulkowski, Narberth, and Albert A. Mascitti, Norristown, Pa., assignors to American Home Products Corporation, New York, N.Y.
No Drawing. Continuation-in-part of application Ser. No. 622,883, Mar. 14, 1967. This application Apr. 16, 1968, Ser. No. 721,591
Int. Cl. C07c *101/42*
U.S. Cl. 260—518 R **7 Claims**

This invention is concerned with toluic acids which are useful precursors in the preparation of 2-[amino-(lower)alkyl]phthalimidines which are utilized as intermediates in preparing 2-[amino(lower)alkyl]isoindolines which are pharmacologically efficacious as anti-depressants and anorexiants. This invention is also concerned with the process of preparing these toluic acid compounds.

3,647,866
METHOD OF OXIDIZING A SECONDARY ALKYL-SUBSTITUTED TOLUENE
Ken Ito and Hiroshi Kaminaka, Toyonaki-shi, Norio Kotera, Amagasaki-shi, Shinji Yamamoto, Iwao Dohgane, and Kosuke Shigehiro, Nishinomiya-shi, Hiroshi Kuruma, Takarazuka-shi, Takashi Chinuki, Hiroshi Yoshitake, and Kenji Tanimoto, Minoo-shi, Shinichi Hasegawa, Amagasaki-shi, and Nobuki Kobayasi, Osaka, Japan, assignors to Sumitomo Chemical Co., Ltd., Osaka, Japan
No Drawing. Filed Oct. 8, 1968, Ser. No. 765,969
Claims priority, application Japan, Oct. 16, 1967, 42/66,679; July 19, 1968, 43/51,315
Int. Cl. C07c *37/08, 63/02, 73/06*
U.S. Cl. 260—524 R **10 Claims**

An oxidation product comprising an oily layer containing a tertiary hydroperoxide of a secondary alkyl toluene and an aqueous layer containing a sodium or potassium salt of a secondary alkyl benzoic acid is obtained by reacting a secondary alkyl toluene with oxygen in the presence of water and a carbonate or bicarbonate containing sodium or potassium in an amount of 0.12 atomic equivalent or more per mole of the secondary alkyl toluene, or a mixture thereof, or in the presence of water and a mixture of salts obtained by replacing up to 90% of said carbonate or bicarbonate with a sodium or potassium salt of a secondary alkyl benzoic acid, until the concentration of hydroperoxide in the oily layer formed has become 15–25% by weight or more. When the tertiary hydroperoxide in the oily layer is cleavaged according to an ordinary procedure by use of an acidic catalyst, cresols are obtained. When the secondary alkyl benzoic acids in the aqueous layer are further oxidized, benzene dicarboxylic acids are obtained.

3,647,867
PROCESS FOR THE MANUFACTURE OF ACRYLIC ACID BY THE OXIDATION OF PROPYLENE AND/OR ACROLEIN
Kurt Sennewald and Alfred Hauser, Knapsack, near Cologne, and Winfried Lork, Friesheim, near Euskirchen, Germany, assignors to Knapsack Aktiengesellschaft, Knapsack, near Cologne, Germany
No Drawing. Filed Aug. 13, 1968, Ser. No. 752,137
Claims priority, application Germany, Aug. 24, 1967, F 63,188
Int. Cl. C07c *57/04*
U.S. Cl. 260—530 N **16 Claims**

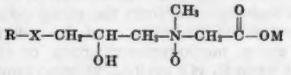
Production of acrylic acid comprising reacting propylene and/or acrolein and/or a substance yielding acrolein under the reaction conditions, such as allyl alcohol, in the gas phase with oxygen at temperatures between 280 and 600° C., under pressures between 0.1 and 10 atmospheres absolute, and for a period of time between 0.1 and 20 seconds, in the presence of steam and in contact with a catalyst consisting of the oxides of silver, iron, bismuth, molybdenum and, if desired, phosphorus, which are present in the atomic ratio of

$$Ag_{0.01-1.5}Fe_{0.1-12}Bi_{0.1-12}P_{0-5}Mo_{12}O_{20-110}$$

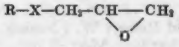
the catalyst being deposited on a carrier, if desired.

3,647,868
N-(2-HYDROXYALKYL) SARCOSINE-N-OXIDES
Robert Ernst, Los Angeles, Calif., assignor to Textilana Corporation, Hawthorne, Calif.
No Drawing. Filed Oct. 18, 1967, Ser. No. 676,035
Int. Cl. C07c *101/12, 101/30*
U.S. Cl. 260—534 M **18 Claims**

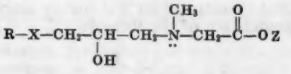
Amine oxide compounds having the formula:



in which X is either oxygen or a methylene radical and R is a higher alkyl group, preferably unsubstituted, having 8–18 carbon atoms when X is oxygen and 6–16 carbon atoms when X is a methylene radical, and M is an alkali metal, hydrogen, ammonia or a water soluble amine group, the compounds being prepared by reacting an alkali metal salt of sarcosine with an epoxy compound having the formula:



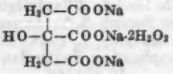
where R and X have the meaning set forth above to yield N-(2-hydroxyalkyl) sarcosine compounds having the formula:



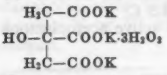
where R and X have the above meaning; and Z is an alkali metal preferably sodium or potassium; thereafter oxidizing these compounds with hydrogen peroxide and, if desired, replacing the alkali metal Z with hydrogen, ammonia, or a water soluble amine.

3,647,869
NOVEL PERHYDRATES OF TRI-ALKALI METAL CITRATES
Hans K. Kaloff, Haan, Germany, assignor to Henkel & Cie, GmbH, Dusseldorf, Germany
No Drawing. Filed Apr. 13, 1970, Ser. No. 28,049
Int. Cl. C07c *59/16*
U.S. Cl. 260—535 P 7 Claims

Perhydrates of trisodium and tripotassium citrate of the formulas



and



useful as oxygen-releasing bleaching components in various cleansing compositions, such as denture cleansers and laundering compositions, and as color developers in hair coloring compositions, and method of preparing such perhydrates.

3,647,870
PROCESS FOR THE PRODUCTION OF META BENZENE DISULFONYL CHLORIDES
Shigeto Suzuki, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.
No Drawing. Filed May 1, 1968, Ser. No. 725,952
Int. Cl. C07c *143/70*
U.S. Cl. 260—543 R 9 Claims

Meta benzene disulfonyl chlorides are produced by heating a mixture of a meta benzene disulfonic acid and carbon tetrachloride in the liquid phase. The reaction is catalyzed by strong mineral acids at a temperature above 130° C.

3,647,871
PROCESS FOR PRODUCING ACETYLCHLORIDE
Herbert Eck, Hans Schwarzbauer, and Hellmuth Spes, Burghausen, Upper Bavaria, Germany, assignors to Wacker-Chemie G.m.b.H., Munich, Bavaria, Germany
No Drawing. Filed Apr. 2, 1969, Ser. No. 812,902
Claims priority, application Germany, Apr. 10, 1968, P 17 68 186.6
Int. Cl. C07c *51/58*
U.S. Cl. 260—544 Y 3 Claims

Process for producing acetylchloride which comprises reacting ketone and hydrogen chloride in acetylchloride.

3,647,872
PREPARATION OF UREA IN COMBINATION WITH THE SYNTHESIS OF AMMONIA
Petrus J. C. Kaasenbrood, Sittard, and Gerardus J. J. M. Taks, Geleen, Netherlands, assignors to Stamicarbon N.V., Heerlen, Netherlands
Filed Dec. 23, 1968, Ser. No. 785,969
Claims priority, application Netherlands, Dec. 21, 1967, 6717524
Int. Cl. C07c *127/00*
U.S. Cl. 260—555 A 7 Claims

A process for the manufacture of urea from ammonia and carbon dioxide is described wherein a technique for reducing the amount of inert gases supplied to urea reactor is utilized. This technique involves first absorbing the ammonia from the ammonia synthesis gas mixture (containing ammonia, hydrogen and nitrogen) in a suitable solvent (water, or an aqueous solution in which ammonia is readily absorbed), and thereafter desorbing the ammonia content of the absorbent solution in a suitable gas stream, the desorption being conducted in such a way that the ammonia content of the desorbed gas mixture is maintained sufficiently high that a relatively much smaller volume of inert gases are thereby introduced into the urea synthesis reactor.

3,647,873
NUCLEAR SULFONYL SUBSTITUTED N-ACYL-BENZENESULFONAMIDES
Carl Ziegler, Glenside, and James M. Sprague, Gwynedd Valley, Pa., assignors to Merck & Co., Inc., Rahway, N.J.
No Drawing. Filed Feb. 3, 1970, Ser. No. 8,413
Int. Cl. C07c
U.S. Cl. 260—556 AC 7 Claims

Nuclear sulfonyl substituted N-acyl-(and N-organosulfonyl)benzenesulfonamides and salts thereof, wherein the benzene ring may be substituted by halo, lower alkyl, trihalomethyl, nitro, carboxy or a hydrocarbylene moiety. The products are prepared by treating a nuclear sulfonyl substituted benzenesulfonamide with an acyl(or organosulfonyl)halide or with a carboxylic acid (or organosulfonic acid)anhydride. The nuclear sulfonyl substituted N-acyl(and N-organosulfonyl)-benzenesulfonamides are uricosuric agents useful in the treatment of gout and gouty arthritis.

3,647,874
N-CYANOBENZOYLHALOALKYLSULFONANILIDES
John F. Gerster, Woodbury, Minn., assignor to Riker Laboratories, Inc., Northridge, Calif.
No Drawing. Filed Apr. 13, 1970, Ser. No. 28,021
Int. Cl. C07c *143/74*
U.S. Cl. 260—556 F 7 Claims

N-cyano benzoylhaloalkylsulfonanilides in which the aromatic rings are optionally substituted. The compounds are active anti-inflammatory agents.

3,647,875
METHOD FOR PREPARING ALKOXY-PROPIONAMIDES
Lester E. Coleman, Willoughby Hills, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio
No Drawing. Continuation-in-part of application Ser. No. 682,493, Nov. 13, 1967, which is a continuation-in-part of abandoned application Ser. No. 586,391, Oct. 13, 1966. This application Mar. 2, 1970, Ser. No. 15,855
Int. Cl. C07c *103/00*
U.S. Cl. 260—561 B 5 Claims

N - 3 - oxohydrocarbon-substituted 3-alkoxypropionamides are prepared by reacting an alcohol with an N-3-oxohydrocarbon-substituted acrylamide in the presence of a strongly alkaline catalyst, the mole ratio of alcohol to substituted acrylamide being between about 8:1 and 12:1. The products are useful as chemical intermediates for the preparation of novel and useful compounds; for example, N-(1,1-dimethyl-3-oxobutyl)-3-methoxypropionamide can be converted to N-(1,1-dimethyl-3-hydroxybutyl)-acrylamide by hydrogenation followed by alkaline pyrolysis.

3,647,876
PROCESS IN THE PREPARATION OF N,N-DI-n-PROPYL-α-CHLOROACETAMIDE
Mearl A. Kise, Portsmouth, and Leonard C. Ellis, Chesapeake, Va., assignors to Virginia Chemicals, Inc., Portsmouth, Va.
No Drawing. Filed Aug. 14, 1969, Ser. No. 850,250
Int. Cl. C07c *103/10*
U.S. Cl. 260—561 HL 10 Claims

This is a process for the preparation of N,N-di-n-propyl-α-chloroacetamide at prevailing natural temperatures, as for example, at 20–30° C. exclusive of an excess of di-n-propylamine. The product is useful as an intermediate for

the production of the so-called "space repellents," N,N-di-n-propyl-2-[(p-methoxybenzyl)oxy]-acetamide, N,N - di-n-propyl-2-(benzyloxy)-acetamide and N,N-di-n-propyl-2[(2methylcyclohexyl)oxy]-acetamide. By this process, α-chloroacetyl chloride and di-n-propylamine are reacted in the presence of aqueous caustic soda (heterogeneous system) at 20–30° C., the reaction being effected in toluene, using a 15% excess of α-chloroacetyl chloride which is added dropwise into the reaction media. Free caustic soda is excluded from the reaction media during addition of the acid chloride until a substantial portion of the α-chloroacetyl chloride has been introduced and allowed sufficient time for reaction. Economically, the process is desirable because the reaction environment need not be so closely controlled at low temperature, and secondly, there is a substantial saving in the quantity of the amine required to effect a satisfactory reaction.

3,647,877
AMINOPROPIONANILIDES

Abraham Weber, Paris, Jacques Jean Frossard, Champigny, and Daniel Bouzard, Franconville, France, assignors to Mead Johnson & Company, Evansville, Ind.

No Drawing. Filed Apr. 13, 1970, Ser. No. 28,120
Int. Cl. C07c *103/44*
U.S. Cl. 260—562 N **5 Claims**

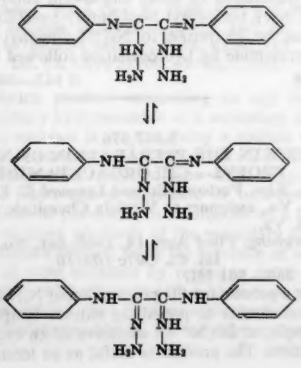
This invention relates to aminopropionanilides which are prepared by acylation of 4′-amino-5′-chloro-2′-methoxy-(2-diethylamino)propionanilide with (lower)alkanoyl halides or (lower)alkanoic acid anhydrides. The diethylamino propionanilide products are pharmacologically active in mammals and when administered thereto in effective doses produced depression of the central nervous system with resulting hypnosis. Diethylaminopropionanilides which are particularly useful as hypnotic agents are 2′-methoxy-4′-acetamido - 5′ - chloro - (2-diethylamino)propionanilide and 2′-methoxy - 4′ - propionamido-5′-chloro-(2-diethylamino)propionanilide.

3,647,878
N,N′-BIS-(PHENYL)-OXAMIDRAZONE

Ulrich Schulze, Elsenfeld, and Gerhard Meyer, Obernburg, Germany, assignors to Glanzstoff AG, Wuppertal, Germany

Filed July 2, 1969, Ser. No. 838,429
Claims priority, application Germany, July 10, 1968, P 17 68 880.1
Int. Cl. C07c *123/00*
U.S. Cl. 260—564 R **1 Claim**

The compound N,N′-bis-(phenyl)-oxamidrazone which is represented by the three tautomeric formulae:



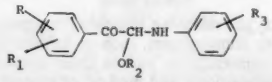
This is useful for the production of polyacyl-oxamidrazones which are valuable polymers, e.g. by reaction with terephthalic acid dichloride.

3,647,879
α-HALOACETYLANILINO-α-ALKOXY-ACETOPHENONES

Elena Massarani, Dante Nardi, and Ludwig Degen, Milan, Italy, assignors to Societe d'Exploitations Chimiques et Pharmaceutiques Seceph S.A., Lugano, Switzerland

No Drawing. Filed July 7, 1969, Ser. No. 839,702
Claims priority, application Switzerland, July 12, 1968, 10,424/68
Int. Cl. C07c *97/10*
U.S. Cl. 260—570.5 C **3 Claims**

Therapeutically active acetophenone derivatives having the formula



wherein R is hydrogen or chlorine; R_1 is hydrogen, chlorine, a nitro group, methyl, methoxy, paraphenyl, paraphenoxy, or paraphenylthio; R_2 is hydrogen or an alkyl group of 1 to 12 carbon atoms, allyl, propargyl, benzyl, or cyclohexyl; R_3 is a group having the formula

$$—CO—CHX_2$$

or $—CO—CX_3$, in which X is chlorine or bromine, the radical R_3 being fixed in position 3 or 4 of the benzene nucleus and a process for their preparation. Also intermediates thereof.

3,647,880
NOVEL FRAGRANCE MATERIALS AND PROCESSES

Jack H. Blumenthal, Oakhurst, N.J., assignor to International Flavors & Fragrances Inc., New York, N.Y.

No Drawing. Filed Aug. 19, 1968, Ser. No. 753,728
Int. Cl. C07c *49/27, 45/00*
U.S. Cl. 260—587 **5 Claims**

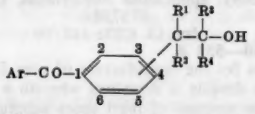
The novel ketone 4-methyl-3-pinanone, mixtures and olfactory compositions containing same, and processes for the production thereof.

3,647,881
NOVEL AROYL PHENETHYL ALCOHOLS

David Edmund Bays and Roy Vivian Foster, London, England, assignors to Allen & Hanburys Limited, London, England

No Drawing. Filed Jan. 13, 1970, Ser. No. 2,665
Claims priority, application Great Britain, Jan. 13, 1969, 1,902/69
Int. Cl. C07c *49/82*
U.S. Cl. 260—591 **17 Claims**

Phenethyl alcohol derivatives of the formula



in which R^1, R^2, R^3 and R^4 which may be the same or different, each represent a hydrogen atom or a straight or branched alkyl radical containing from 1 to 4 carbon atoms; Ar represents a phenyl ring, which may be substituted by one or more trifluoromethyl, hydroxy, methoxy or methyl radicals or by one or more halogen atoms are provided. These possess useful anti-inflammatory activity.

3,647,882

PROCESS FOR THE MANUFACTURE OF ACETYLDEHYDE FROM VINYL ACETATE

Gunter Roscher, Kelkheim, Taunus, and Heinz Schmitz, Frankfurt am Main, Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt am Main, Germany

No Drawing. Filed May 16, 1968, Ser. No. 729,556
Claims priority, application Germany, May 27, 1967, F 52,529
Int. Cl. C07c 47/06
U.S. Cl. 260—601 R 6 Claims

Process for the production of acetaldehyde by hydrolysis of vinyl acetate in the presence of a compound containing chemically bound phosphorus, e.g. free phosphoric acids, heteropolyacids thereof, acid salts of these acids and mixtures of phosphoric acids with compounds of the elements of subgroup V or VI of the Mendeléeff Periodic Table as catalysts.

3,647,883

OLEFIN DIMERIZATION

Michael Dubeck, Birmingham, and David R. Brackenridge, Royal Oak, Mich., assignors to Ethyl Corporation, New York, N.Y.

No Drawing. Filed July 30, 1969, Ser. No. 846,224
Int. Cl. C07c 3/10
U.S. Cl. 260—683.15 D 14 Claims

A process for dimerizing olefins by contacting C_{2-18} olefins with a catalyst system comprising nickel chelate and trihydrocarbyl boron compounds; for example, bis (2,4-pentanedionato) nickel and triethylboron, at temperatures from 100° to 200° C. and optionally in the presence of a non-polar solvent.

3,647,884

LIQUID-VAPOR PHASE OXIDATION METHOD FOR PRODUCING DIALKYL SULFOXIDES

Masanori Tatsumi and Hisao Abe, Kamakura, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Mar. 11, 1970, Ser. No. 18,501
Int. Cl. C07c 147/14
U.S. Cl. 260—607 A 4 Claims

An improved liquid-vapor phase oxidation method for producing dialkyl sulfoxides which comprises feeding a nitrogenous oxide gaseous catalyst, a molecular oxygen-containing gas and a liquid dialkyl sulfide into an oxidizing zone of the gas-liquid concurrent tower type from thereunder, and withdrawing the liquid reaction product containing a corresponding dialkyl sulfoxide from the upper part of the liquid phase in said zone, characterized by introducing a purge gas into the cooled upper reaction area maintained at a temperature of 15 to 45° C. to purge a part of said catalyst and withdraw it from a space at the upper end of said oxidizing zone, then conducting a flow of the liquid reaction mixture to a bubble tower-type purging zone maintained at a temperature exceeding 45° C. but not over 100° C., introducing a purge gas to purge the remainder of the catalyst present in the liquid reaction product, and withdrawing the liquid reaction product from said purging zone.

3,647,885

PROCESS FOR THE PRODUCTION OF PHENOL SULFIDES

Emil J. Geering, Grand Island, and George B. Stratton, Lewiston, N.Y., assignors to Hooker Chemical Corporation, Niagara Falls, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 666,915, Sept. 11, 1967, which is a continuation-in-part of application Ser. No. 597,228, Nov. 28, 1966. This application Dec. 30, 1968, Ser. No. 788,082
Int. Cl. C07c 149/36
U.S. Cl. 260—608 6 Claims

Producing phenol sulfides by reducing a phenol-sulfide produced by reacting elemental sulfur and a phenolic reactant in the presence of a basic catalyst and carrying the reaction to a degree of completion at which the maximum number of moles of hydrogen sulfide evolved is up to about 33 percent of the number of moles of sulfur charged to said reaction, and a process for converting the phenol-sulfides to mercaptophenols.

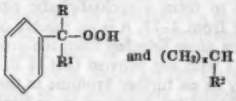
3,647,886

HYDROCARBON OXIDATION

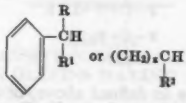
Theodore C. Mead, Texaco Inc., P.O. Box 1608, Port Arthur, Tex. 77640; and Harry Chafetz, Texaco Inc., P.O. Box 509, Poughkeepsie, N.Y. 12508

No Drawing. Filed Feb. 8, 1968, Ser. No. 703,913
Int. Cl. C07c 73/08
U.S. Cl. 260—610 B 4 Claims

A method of producing a hydrocarbon hydroperoxide selected from the group consisting of



where R and R^1 are hydrogen or alkyl of from 1 to 10 carbons and at least one of said R and R^1 is alkyl, R^2 is n-alkyl of from 1 to 10 carbons and x is an integer of from 3 to 10, comprising contacting a hydrocarbon selected from the group consisting of



where R, R^1, R^2 and x are as heretofore defined with an oxygen containing gas in the presence of alkali metal fluoride.

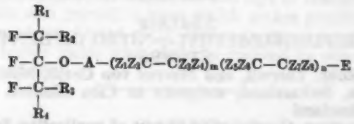
3,647,887

ARYL-SUBSTITUTED POLYFLUORO-ALKOXYALKANES

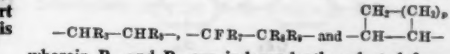
Louis G. Anello, Orchard Park, and Richard F. Sweeney, Elma, N.Y., and Morton H. Litt, Cleveland, Ohio, assignors to Allied Chemical Corporation, New York, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 633,359, Apr. 25, 1967. This application May 25, 1970, Ser. No. 40,431
Int. Cl. C07c 43/00
U.S. Cl. 260—611 A 40 Claims

Novel telomers of the formula



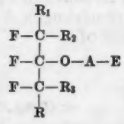
wherein R_1–R_4 are each F, Cl, H, alkyl ar haloalkyl groups, or when taken together, are alkylene or haloalkylene groups forming a cycloaliphatic structure, which R_1–R_4 groups may each have from 1 to 9 carbon atoms and which halogen atoms, if any, have an atomic weight not exceeding about 79.92, with the proviso that no more than two of the four R_1–R_4 groups are alkyl groups, A is a member selected from the group consisting of radicals of the formulae



wherein R_5 and R_6 are independently selected from the group consisting of Cl, H and alkyl with the proviso that at least one of R_5 and R_6 is Cl; R_7 and R_8 are independently selected from the group consisting of F and H; R_9

is selected from the group consisting of F, H, Cl, Br and perfluoroalkyl; *p* is an integer of from 1 to 9; with the proviso that when both R_8 and R_9 are F, R_7 is always F; Z_1–Z_8 may each be selected from the group consisting of H, F, Cl, Br, alkyl radicals having from 1–8 carbon atoms, haloalkyl radicals having from 1–8 carbon atoms in which haloalkyl radicals the halogen atoms have an atomic weight not exceeding about 79.92; phenyl radicals and substituted phenyl radicals selected from the group consisting of alkyl-substituted phenyl radicals having up to eight carbon atoms in the alkyl group, halo-substituted phenyl radicals, and haloalkyl-substituted phenyl radicals having up to eight carbon atoms in the alkyl group, or mixtures thereof, in which haloalkyl- or halo-substituted phenyl radicals the halogen atoms have an atomic weight not exceeding about 79.92, with the provisos that Z_1–Z_8 includes at least one phenyl or substituted phenyl radical and Z_1–Z_8 do not include more than two chlorine atoms and one bromine atom; Z_1 and Z_3 or Z_5 and Z_8 may be joined together to form a cycloaliphatic ring system; *m* is an integer of from 1–75, *n* is an integer of from 0–75, and E is halogen atom selected from the group consisting of I, Br and Cl with the proviso that if E is a bromine atom there may be no further bromine in the molecule.

These compounds are prepared by radical addition reaction of polyhaloisoalkoxyalkyl halide telogens of the formula



wherein R_1–R_4 are as defined above, or dissimilar lower molecular weight telomers, with telomerizable unsaturated compounds. The telomerization reaction may be initiated by heat or by means of a free-radical initiating catalyst. The telogen starting materials may be prepared by reacting a corresponding halogenated ketone with an ionizable fluoride salt, e.g. CsF, to form a fluorinated organic salt and then reacting the organic salt with a halogen other than fluorine and an olefin. After telomerization the telomers may be stabilized by replacing the E iodine or bromine atom with hydrogen or fluorine. The novel telomers are useful as insulator and condenser fluids, hydraulic fluids, lubricants, heat transfer media and as intermediates in the preparation of useful surfactants and polyacrylate oil and stain repellent agents.

3,647,888

TRIFLUOROMETHYL-p-NITRO DIPHENYL ETHERS

Otto Rohr, Therwil, and Marcus von Orelli, Muenchenstein, Switzerland, assignors to Ciba Limited, Basel, Switzerland

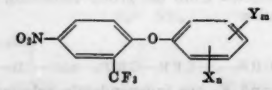
No Drawing. Continuation-in-part of application Ser. No. 680,334, Nov. 3, 1967. This application Apr. 1, 1970, Ser. No. 24,851

Claims priority, application Switzerland, Nov. 11, 1966, 16,260/66

Int. Cl. C07c *43/20*

U.S. Cl. 260—612 R **3 Claims**

The present invention relates to compounds of the general formula



wherein X is a member selected from the group consisting of a halogen atom, an alkyl group having 1 to 4 carbon atoms, the group —OCH_3, —SCH_3, —NO_2 and —CF_3, Y is a member selected from the class consisting of a halogen atom and an alkyl group having 1 to 4 carbon atoms, and *n* and *m* denote integers from 0 to 3, whose sum is at most 5, as well as to molluscicidal preparations containing such compounds.

3,647,889

POLYFLUOROISOPROPOXYALKYL ETHERS

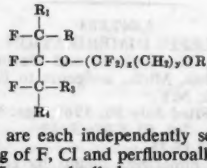
Louis G. Anello, Orchard Park, and Richard F. Sweeney, Elma, N.Y., and Morton H. Litt, Cleveland, Ohio, assignors to Allied Chemical Corporation, New York, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 633,359, Apr. 25, 1967. This application May 25, 1970, Ser. No. 40,434

Int. Cl. C07c *43/00*

U.S. Cl. 260—615 R **19 Claims**

Compounds of the formula:



wherein R_1–R_4 are each independently selected from the group consisting of F, Cl and perfluoroalkyl, and together can form a perfluorocycloalkylene group, with the proviso that R_1–R_4 may not contain more than two chlorine atoms, *x* is an integer from 1–81, *y* is an integer from 1–81, and R is a member selected from the group consisting of alkyl and perhydrofluoroalkyl; are useful as insulator and condenser fluids, hydraulic fluids, lubricants and heat-transfer media. These compounds are also surface-active and are useful as anti-wetting agents.

3,647,890

METHOD FOR REDUCING KETONES

Maurice M. Kreevoy, Richard F. Borch, and Jonathan E. C. Hutchins, Minneapolis, Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.

No Drawing. Filed Sept. 5, 1969, Ser. No. 855,735

Int. Cl. C07c *29/00, 35/00*

U.S. Cl. 260—617 C **8 Claims**

The invention provides a method for reducing ketones with the cyanoborohydride of lithium, sodium or potassium or a quaternary ammonium cyanoborohydride or their corresponding deuterides or tritides. The reaction is conducted in a solvent medium selected from tetrahydrofuran, water, methanol, ethanol, diethyl ether and mixtures there of at a pH between about 2 and 7, preferably about 2 and 4, and at a temperature between room temperature and the reflux temperature of the solvent.

3,647,891

METHYLOL-TERMINATED FLUOROCARBON POLYMERS

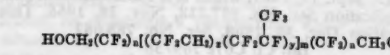
Basil L. Loudas, St. Paul, and David E. Rice, Woodbury, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

No Drawing. Filed July 1, 1968, Ser. No. 741,299

Int. Cl. C07c *31/34*

U.S. Cl. 260—633 **4 Claims**

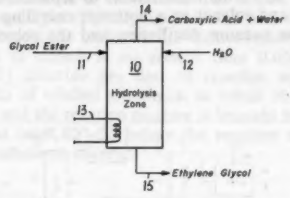
Methylol-terminated fluorocarbon polymers having the general formula



are prepared by reduction of the corresponding ester precursors, for example, with sodium borohydride. Said

methylol-terminated polymers can be cured with polyisocyanate crosslinking agents and used as binders in solid rocket propellants.

3,647,892
PREPARATION OF ETHYLENE GLYCOL
Robert Hoch, New York, N.Y., assignor to Halcon International, Inc.
Filed Apr. 28, 1969, Ser. No. 819,776
Int. Cl. C07c *31/20*; C08g *17/06*
U.S. Cl. 260—635 R 6 Claims



This invention relates to a process for the preparation of ethylene glycol by the hydrolysis of a lower carboxylic acid ester of ethylene glycol which has significant advantages over those processes heretofore known. This process involves the introduction of the ester to a hydrolysis zone having at least two hydrolysis equilibration stages. Also added to the hydrolysis zone is H_2O. Within the zone, the ester is counter-currently contacted with steam in order to effect the hydrolysis and to produce a vapor mixture of carboxylic acid and water as well as liquid ethylene glycol, both the vapor mixture and the ethylene glycol being withdrawn from the zone.

3,647,893
PROCESS FOR THE PREPARATION OF ALKYL AND ARYL IODINE
Leonard S. Silbert, Apt. 105, Pastorious Bldg. 7800C, Stenton Ave., and Daniel Swern, 7803 Rugby St., both of Philadelphia, Pa. 19118
No Drawing. Original application Feb. 28, 1968, Ser. No. 708,800. Divided and this application Mar. 23, 1970, Ser. No. 24,922
Int. Cl. C07c *79/12, 25/04*
U.S. Cl. 260—646 7 Claims

Alkyl and aryl iodides are prepared by the decomposition of the corresponding acyl and aroyl peroxides in iodine solutions of selected solvents. Aryl iodides are prepared in high yields by complete decomposition in two hours at 110° C. of aroyl peroxides in iodine solutions of solvents such as 1,1,2,2-tetrachlorodifluorethane (Freon 112), 1,3-dichloropropane and 1,3-dibromopropane. Chlorobenzene, 1-iodobutane and Freon 112 are preferred solvents for the decomposition of aliphatic acyl peroxides but good yields are obtained using a number of other aromatic and aliphatic solvents such as anisole, toluene, benzene, 1-chloro-3-fluorobenzene, 1,3-dichloropropane, 1,2-dichloroethane, 1-chlorohexane and 1-iodopropane.

3,647,894
RECOVERY OF 1,2,4,5-TETRACHLOROBENZENE AND HEAT TRANSFER AGENTS
Larry L. Jackson and William D. Watson, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.
No Drawing. Filed Feb. 9, 1970, Ser. No. 9,974
Int. Cl. C07c *25/04*
U.S. Cl. 260—650 R 5 Claims

From a crude mixture of the isomers of tetrachlorobenzene, 1,2,4,5-tetrachlorobenzene may be isolated by dissolving the crude mixture in a halogenated diphenyl ether and fractionally crystallizing the 1,2,4,5-tetrachlorobenzene from solution. The mother liquor after crystallization is also useful as a fire resistant heat transfer agent having high flash and fire points.

3,647,895
PROCESS FOR THE PURIFICATION OF CHLORINATED HYDROCARBONS
Otto Fruhwirth and Ludwig Schmidhammer, Burghausen, Upper Bavaria, Germany, assignors to Wacker-Chemie G.m.b.H., Munich, Germany
No Drawing. Filed Apr. 15, 1969, Ser. No. 816,385
Claims priority, application Germany, Apr. 23, 1968, P 17 68 269.8
Int. Cl. C07c *25/02, 19/00, 21/00*
U.S. Cl. 260—650 R 5 Claims

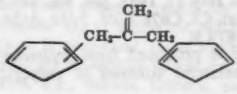
A process for the purification of chlorinated hydrocarbons containing metallic salts of a Lewis-acid type character, as employed as catalysts in a chlorination reaction, which comprises mixing a chlorinated hydrocarbon containing metallic salts of a Lewis-acid type character with from 1 to 5 mols, based on the amount of metallic salt contaminant, of an anhydrous 1,2-monoalkanolamine having from 2 to 4 carbon atoms and from 0 to 4 mols, based on the amount of metallic salt contaminant, of dry ammonia, and separating the insoluble metallic salts from said chlorinated hydrocarbons.

3,647,896
SOLUBLE TRANSITION METAL CATALYSTS FOR PREPARING OLEFINS HAVING AN EXOCYCLIC DOUBLE BOND
James E. Lyons, Wallingford, Pa., assignor to Sun Oil Company, Philadelphia, Pa.
No Drawing. Continuation-in-part of application Ser. No. 805,343, Mar. 7, 1969. This application Oct. 31, 1969, Ser. No. 873,092
Int. Cl. C07c *5/24*
U.S. Cl. 260—666 A 13 Claims

Cyclic hydrocarbons having one or more side chains containing olefinic unsaturation can be isomerized to the corresponding cyclic hydrocarbon containing double bonds exocyclic to the ring through the use of a ligand-stabilized group VIII metal complex in homogeneous solution. The catalyst used has a metal-hydrogen bond or is a complex which, in situ, can either abstract hydrogen from the olefin to form a metal-hydrogen bond, or form such a bond in the presence of added hydrogen. The complexes, which are hydrocarbon-soluble provide a homogeneous rather than a heterogeneous system for this type of reaction. The catalysts also provide a route which makes possible conversion of substituted cyclic olefins to the exocyclic olefin in higher yields than could be realized by other catalytic methods.

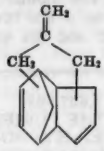
3,647,897
BIS-CYCLOPENTADIENYLIC COMPOUNDS AND PROCESS OF PREPARING SAME
André Lakodey and Francis Weiss, Pierre-Benite, France, assignors to Ugine Kuhlmann
No Drawing. Filed Nov. 28, 1969, Ser. No. 880,994
Claims priority, application France, Nov. 29, 1968, 175,924
Int. Cl. C07c *13/62*
U.S. Cl. 260—666 PY 2 Claims

Novel products comprising 1,3-bis-cyclopentadienyl 2-methylene propane of the following formula:



(I)

and its novel isomer, dicyclopentadiene having the following structure



(II)

The novel products are prepared by reacting a 1,3-dihalogeno 2-methylene propane with an organometallic derivative of cyclopentadienyl in the presence of an inert solvent.

3,647,898

EQUILIBRATION OF LOWER ALKYL SUBSTITUTED POLYALKYL AROMATIC HYDROCARBONS WITH REDUCED DISPROPORTIONATION

John J. Brodbeck, El Cerrito, Calif., assignor to Chevron Research Company, San Francisco, Calif.

No Drawing. Filed Jan. 14, 1970, Ser. No. 2,948
Int. Cl. C07c *15/08*
U.S. Cl. 260—668 A **9 Claims**

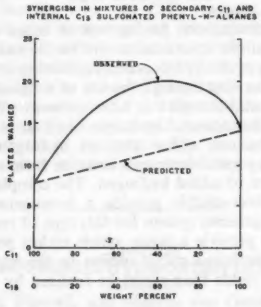
Disproportionation losses in the isomerization of C_8 aromatic hydrocarbons are reduced by the use of silica-alumina catalyst composites with high surface areas and having pore radii in the main above about 45 A.

3,647,899

LINEAR ALKYLBENZENE COMPOSITIONS

Alan E. Straus, El Cerrito, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed June 11, 1969, Ser. No. 832,293
Int. Cl. C07c *15/04*
U.S. Cl. 260—668 **3 Claims**



Sulfonated derivatives of novel detergent alkylate compositions exhibiting superior synergistic detergent characteristics comprise mixtures of secondary C_{11} and C_{15} sulfonated phenyl-n-alkanes in a weight ratio of from 1:10 to about 4:1, respectively.

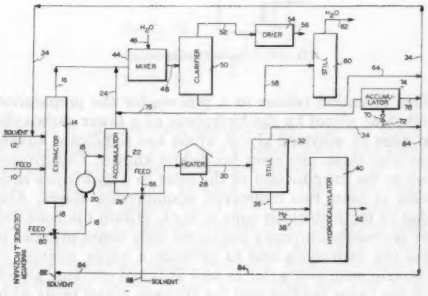
3,647,900

PROCESS FOR CONCENTRATION AND CONVERSION OF HYDROCARBONS

George J. Rozman, Ashland, Ky., assignor to Ashland Oil & Refining Company, Houston, Tex.

Filed July 17, 1968, Ser. No. 745,516
Int. Cl. C07c *7/06, 7/10, 3/58*
U.S. Cl. 260—674 R **20 Claims**

Naphthalene is produced from hydrocarbon fractions containing substantial volumes of polycyclic aromatics, such as light cycle oils from a catalytic cracking unit, by contacting the hydrocarbon feed with an organic sulfoxide, such as dimethylsulfoxide; separating an extract phase and a first raffinate phase from one another; passing the extract phase to a vacuum distillation column under conditions to form an azeotropic mixture of a second raffinate phase and the solvent as an overhead and the extract phase as a bottoms; separating the azeotropic mixture into a second raffinate phase and a solvent phase; combining the first raffinate phase and the second raffinate phase and mixing the same with water; separating the raffinate phase from a water-solvent mixture; subjecting the water-solvent mixture to vacuum distillation to separate water as an overhead and solvent as a bottoms; recycling the solvent from the vacuum distillation and the solvent separated from the azeotrope back to the extraction unit; and subjecting the extract from the azeotropic distillation unit to hydrodealkylation to produce a dealkylated product. If desired, a third raffinate phase can be separated from the original extract phase of the extraction step by cooling the extract phase to essentially ambient temperature. When a feed material is sufficiently concentrated in polycyclic aromatics, the extraction step may be eliminated and the feed can be combined with solvent just prior to the azeotropic distillation stage, or a feed of low polycyclic aromatics may be subjected to extraction and a feed of higher polycyclic aromatic content may be added to the extract just prior to the azeotropic distillation stage.



3,647,901

COBALT SALT-PHOSPHINE-ORGANOALUMINUM CATALYSTS FOR PREPARING 1,4-DIENES

Christos Sarafidis, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

No Drawing. Continuation-in-part of application Ser. No. 616,771, Feb. 17, 1967. This application June 22, 1970, Ser. No. 48,504
Int. Cl. C07c *11/12*
U.S. Cl. 260—680 B **10 Claims**

A catalyst for use in preparing 1,4-dienes from alpha-monoolefins and conjugated dienes. The catalyst is prepared by mixing, in any order, an organoaluminum compound, a cobalt salt and a diphenyl alkenyl or dialkenyl phenyl phosphine in a liquid medium, either in the presence of the monomers or separately. The reaction for preparing the 1,4-dienes is carried out in an inert organic solvent at temperatures of 25 to 150° C. and pressures ranging from 1 atmosphere to 2000 p.s.i.g. The invention provides catalysts which are readily available and which form 1,4-dienes at feasible rates with a minimum of by-product formation.

3,647,902
PROCESS FOR PREPARING 1,4-HEXADIENE
Gisela Henrici Henrici and Salvador Olivé Martin, Zurich, Switzerland, assignors to Monsanto Company, St. Louis, Mo.
No Drawing. Filed Sept. 25, 1969, Ser. No. 861,499
Claims priority, application Switzerland, Oct. 2, 1968, 14,875/68
Int. Cl. C07c *3/10*
U.S. Cl. 260—680 B 6 Claims

An improved process for preparing 1,4-hexadiene by reaction of ethylene and 1,3-butadiene under pressure in a solvent and in an inert atmosphere in the presence of a catalytic system of a combination of cobalt (II) chloride 1,2-bis-(diphenylphosphino)-ethane and triethyl aluminum wherein the solvent is 1,2-dichloroethane, the concentration of cobalt is no greater than 0.0005 mol of cobalt (II) chloride per liter of reaction mixture, the molar ratio of triethyl aluminum to cobalt chloride is at least 200, and the reaction mixture is brought to a temperature of at least 80° C. before the reaction of ethylene with 1,3-butadiene occurs.

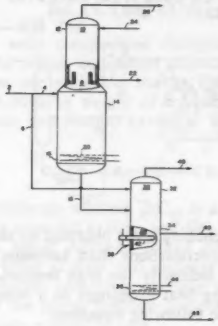
3,647,903
METHOD OF PREPARING DIOLEFINS HAVING CONJUGATED DOUBLE BONDS
Jean Maurin, Montivilliers, France, assignor to Compagnie Francaise de Raffinage, Paris, France
Filed May 4, 1970, Ser. No. 34,172
Claims priority, application France, May 8, 1969 6914751
Int. Cl. C07c *1/00, 1/20*
U.S. Cl. 260—681 13 Claims

A method for preparing a diolefin such as isoprene has been provided whereby an α-glycol or an α-epoxy as a precursor for a monoester formation is reacted directly or first obtained from a paraffin by hydroperoxidation and then reacted with an acid or its anhydride to obtain said monoester and the monoester pyrolyzed to obtain a desired diolefin. In the pyrolysis step the acid is obtained as a recycleable starting material. The process is characterized by improved yields of the diolefin and minimized amounts of carbonyl compounds.

3,647,904
PROCESS FOR THE PREPARATION OF UNSATURATED POLYESTER RESIN
Masaya Imai, Suita-shi, Masuji Izubayashi, Osaka, Keiichi Takiyama and Mitsuo Hirai, Suita-shi, and Masao Nikki, Ibaraki-shi, Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan
No Drawing. Filed Sept. 4, 1969, Ser. No. 885,415
Claims priority, application Japan, Sept. 9, 1968, 43/64,488; Jan. 22, 1969, 44/4,090
Int. Cl. C08g *17/007, 17/12, 39/06*
U.S. Cl. 260—861 4 Claims

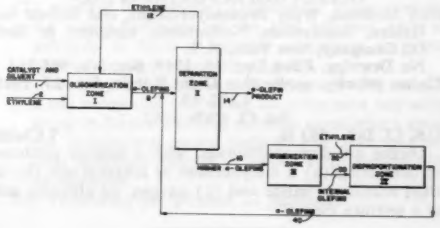
A process for the preparation of an unsaturated polyester resin, which comprises adding hydrogen peroxide to a mixture of an unsaturated organic compound containing an unsaturated radical which can be epoxidated with an organic peracid, with a polycarboxylic anhydride, at temperatures ranging from 10 to 120° C., to perform the epoxidation reaction, said unsaturated organic compound being selected from the group consisting of hydrocarbons, halogenated hydrocarbons, carboxylic acids, carboxylates and alkyl ethers containing the unsaturated radical; heating the reaction mixture to 150–250° C. in an inert gaseous current to effect the polyesterification thereof; and thereafter mixing the resulting unsaturated polyester with a monomer which is copolymerizable with the polyester.

3,647,905
ISOSTRIPPER WITH NORMAL BUTANE REMOVAL IN AN ALKYLATION SYSTEM
Charles C. Chapman, Bartlesville, Okla., assignor to Phillips Petroleum Company
Filed Jan. 29, 1970, Ser. No. 6,658
Int. Cl. B01d *3/00;* C07c *3/50;* C10g *7/00*
U.S. Cl. 260—683.4 2 Claims



An isostripper is provided in an alkylation fractionation system in which a portion of the isobutane is initially discharged from a depropanizer, and a portion of the alkylation hydrocarbon feedstream is passed to the isostripper at a location above the entry of the depropanized stream. A normal butane vapor stream is removed from the middle portion of the isostripper adjacent a heating zone therein. The isostripper requirement is thus lower and it also operates in a more uniform and constant manner.

3,647,906
ALPHA-OLEFIN PRODUCTION
Francis F. Farley, Oakland, Calif., assignor to Shell Oil Company, New York, N.Y.
Filed May 11, 1970, Ser. No. 36,241
Int. Cl. C07c *3/62, 3/10*
U.S. Cl. 260—683 D 5 Claims



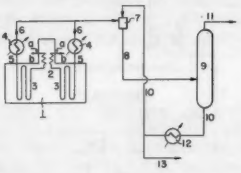
Ethylene is converted to linear α-olefins of a selected range of carbon atoms by (1) oligomerizing ethylene to linear α-olefins, (2) separating the linear α-olefins into a lower α-olefin fraction of the selected range of carbon atoms and a higher α-olefin fraction, (3) recovering the lower α-olefin fraction as product, (4) isomerizing the higher α-olefin fraction to internal olefins, (5) disproportionating the internal olefins with excess ethylene to produce additional lower α-olefins which are recycled to step 2 for separation. By a preferred modification of the process ethylene is converted to an α-olefin product mixture of a controlled molecular weight range and free of lower oligomers, e.g., dimers, trimers, etc.

3,647,907

PROCESS FOR QUENCHING A GAS OBTAINED BY THERMAL CRACKING OF HYDROCARBONS

Takehiko Sato and Hiroyuki Sagami, Yokkaichi-shi, Japan, assignors to Mitsubishi Petrochemical Co. Ltd., Chiyoda-ku, Tokyo, Japan

Filed Aug. 22, 1969, Ser. No. 852,275
Claims priority, application Japan, Sept. 6, 1968, 43/64,196
Int. Cl. C10g 9/12; C07c 3/00
U.S. Cl. 260—683 4 Claims



Process for quenching a gas obtained by thermal cracking of heavier hydrocarbons than kerosene which comprises quenching indirectly the high temperature cracked gas in a quenching heat exchanger to a temperature (T) represented by the following equation:

$$T=0.56\times t+\alpha$$

wherein t is a volumetric average boiling point of the feed hydrocarbons and

$$t=\frac{t_{10}+t_{30}+t_{50}+t_{70}+t_{90}}{5}$$

in which t_{10}, t_{30}, t_{50}, t_{70} and t_{90} is a temperature of (° C.) at which 10 volume percent, 30 volume percent, 50 volume percent, 70 volume percent and 90 volume percent of feed hydrocarbons is distilled in ASTM distillation, respectively, and α is a temperature in the range of 340–420° C., and T is a temperature above 450° C. but not exceeding 600° C., said temperature (T) being a temperature of the cracked gas at an outlet of the quenching heat exchanger, and further quenching directly the cracked gas to a temperature of 150–250° C. by spraying heavier oil.

3,647,908

OLEFIN DISPROPORTIONATION

Dirk Medema, Willy Brunmayer-Schilt, and Robert van Helden, Amsterdam, Netherlands, assignors to Shell Oil Company, New York, N.Y.

No Drawing. Filed Dec. 15, 1969, Ser. No. 885,264
Claims priority, application Great Britain, Jan. 27, 1969, 4,477/69
Int. Cl. C07c 3/62
U.S. Cl. 260—683 D 7 Claims

Olefins are disproportionated with a catalyst produced by contacting (a) a molybdenum or tungsten salt (b) an alkyl aluminum halide and (c) oxygen, an alkanoic acid or a mixture thereof.

3,647,909

REGENERATION OF CHROMIA-ALUMINA DEHYDROGENATION CATALYST

Glenn O. Michaels, South Holland, Ill., assignor to Atlantic Richfield Company, New York, N.Y.

No Drawing. Filed Feb. 10, 1970, Ser. No. 9,992
Int. Cl. B01j 11/04; C07c 5/18
U.S. Cl. 260—683.3 7 Claims

An improved method for the dehydrogenation of paraffins and monoolefins, to produce olefin components containing a greater ratio of carbon to hydrogen, in the presence of a chromia-alumina dehydrogenation catalyst is disclosed. The activity and selectivity of the catalyst are maintained by periodically regenerating the catalyst at a temperature above about 1150° or 1200° F., preferably from about 1300° to 1500° F., and at least about 75° F., preferably at least about 100° F., above the average temperature of dehydrogenation. The higher temperatures are achieved by burning of carbonaceous deposits on the catalyst. Coke-formers can be added to the regeneration gas, to increase the regeneration temperature.

3,647,910

DEHYDROGENATION OF HYDROCARBONS EMPLOYING A CATALYST OF IRON OXIDE-CONTAINING ACTIVATED CARBON

Arthur L. Jones, Solon, and Roger M. Benslay, Northfield, Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

No Drawing. Filed Mar. 20, 1970, Ser. No. 21,540
Int. Cl. C07c 11/12
U.S. Cl. 260—683.3 R 9 Claims

Olefins, such as propylene, are produced by contacting a mixture of an alkane, such as propane, air, steam, and optionally hydrogen sulfide or sulfur dioxide with an iron oxide-containing activated carbon at an elevated temperature and recovering the product.

3,647,911

DEHYDROGENATION OF SATURATED HYDROCARBONS

Kenneth D. Vesely, Arlington Heights, and Harold D. Gass, Jr., Cicero, Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

No Drawing. Filed June 17, 1969, Ser. No. 834,165
Int. Cl. B01j 11/74; C07c 5/18
U.S. Cl. 260—683.3 8 Claims

Saturated hydrocarbons are dehydrogenated in contact with a catalyst comprising arsenic in from about a 0.15 to about a 0.45 atomic ratio with platinum, and from about 0.01 to about 1.5 wt. percent lithium composited with alumina. Improved activity and selectivity results from the method of reducing and sulfiding the catalyst prior to use.

3,647,912

PREPARATION OF LINEAR OLEFIN PRODUCTS

Arthur W. Langer, Jr., Watchung, Plainfield, N.J., assignor to Esso Research and Engineering Company

No Drawing. Continuation-in-part of application Ser. No. 581,433, Sept. 23, 1966, which is a continuation-in-part of application Ser. No. 562,088, July 1, 1966. This application Mar. 4, 1969, Ser. No. 805,116
The portion of the term of the patent subsequent to Apr. 29, 1986, has been disclaimed
Int. Cl. C07c 3/10
U.S. Cl. 260—683.15 D 10 Claims

A linear alpha olefin product comprising at least 90 mole percent linear alpha olefins is prepared by polymerizing ethylene in the presence of a catalyst containing the reaction product of a transition metal halide and an aluminum alkyl, the reaction being effected in a diluent at ethylene pressures in excess of about 50 p.s.i.a. and with a mole ratio of ethylene to product olefin of at least about 0.8.

3,647,913

PURIFICATION OF OLEFINS

Evalds Lasis, Sarnia, Ontario, Canada, assignor to Polymer Corporation Limited, Sarnia, Ontario, Canada

No Drawing. Filed July 27, 1970, Ser. No. 58,669
Claims priority, application Canada, Sept. 8, 1969, 61,363
Int. Cl. C07c 7/02
U.S. Cl. 260—681.5 11 Claims

Impure olefin streams of, e.g., butadiene, intended for polymerization, are purified to remove impurities harmful in subsequent polymerization, such as acetylenes and

cumulative diolefins, by treating them with catalysts which selectively polymerize the impurities to solid, readily removable products, whilst leaving the olefin unaffected. An example of a suitable catalyst is a mixture of ferrous octoate and aluminum triethyl.

3,647,914
ETHYLENE OLIGOMERIZATION

Peter W. Glockner, Alameda, Wilhelm Keim, Berkeley, and Ronald F. Mason, Mill Valley, Calif., assignors to Shell Oil Company, New York, N.Y.

No Drawing. Filed Nov. 4, 1969, Ser. No. 874,058
Int. Cl. C07c *3/10*
U.S. Cl. 260—683.15 D **12 Claims**

Ethylene is oligomerized to a mixture of olefinic products of high linearity in the presence of a nickel chelate of a bidentate ligand having a tertiary organophosphorus moiety and a functional group selected from hydroxymethyl, mercaptomethyl, hydrocarboyl and hydrocarbyloxycarbonyl substituted on a carbon atom attached directly to the phosphorus atom of the organophosphorus moiety.

3,647,915
ETHYLENE OLIGOMERIZATION

Ronald S. Bauer, Orinda, Peter W. Glockner, Alameda, Wilhelm Keim, Berkeley, and Ronald F. Mason, Mill Valley, Calif., assignors to Shell Oil Company, New York, N.Y.

No Drawing. Filed Nov. 4, 1969, Ser. No. 874,059
Int. Cl. C07c *3/10*
U.S. Cl. 260—683.15 D **10 Claims**

Ethylene is oligomerized to an oligomeric product mixture of high linearity in the presence of a nickel chelate of a bidentate ligand having a tertiary organophosphine moiety and a carbamyl or aryl-substituted carbamyl group substituted on a carbon atom attached directly to the phosphorous atom of the organophosphine moiety.

3,647,916
ISOPARAFFIN-OLEFIN ALKYLATION WITH CRYSTALLINE ZEOLITE CATALYSTS AT LOW ISOPARAFFIN TO OLEFIN RATIOS

Philip D. Caesar, Princeton, and Werner O. Haag, Trenton, N.J., and John J. Wise, Philadelphia, Pa., assignors to Mobil Oil Corporation

No Drawing. Filed Oct. 8, 1969, Ser. No. 864,862
Int. Cl. C07c *3/52*; B01j *11/02*
U.S. Cl. 260—683.43 **10 Claims**

A continuous process for alkylation of a branched chain hydrocarbon with an olefin in the presence of a crystalline aluminosilicate zeolite catalyst employing a reaction mixture in which the molar ratio of isoparaffin to olefin is extremely low compared to conventional alkylation, i.e. generally below 3 to 1 followed by regeneration and reuse of the catalyst so employed.

3,647,917
ROOM TEMPERATURE VULCANIZABLE SILICONE RUBBER WITH UNPRIMED ADHESION

Jay R. Schulz, Bay City, and William H. Clark, Mount Pleasant, Mich., assignors to Dow Corning Corporation, Midland, Mich.

No Drawing. Filed Apr. 6, 1970, Ser. No. 26,067
Int. Cl. C08g *47/06*
U.S. Cl. 260—825 **35 Claims**

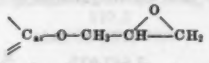
A mixture of a polydiorganosiloxane having hydroxy, acetoxy or alkoxy functionality and a mixture containing at least 10 weight percent of an alkoxyacetoxysiloxane plus alkoxy and acetoxy silanes vulcanizes at room temperature to provide a silicone rubber with improved unprimed adhesion to substrates such as metals.

3,647,918
EPOXY RESIN AND DIGLYCIDYLISOALKYLAMINE COMPOSITION

Johannes Wöllner, Kapellen Kreis, Moers, Martin Karl Cherubim, Rheinkamp-Eick, and Friedrich Gerhard Henn, Homberg (Lower Rhine), Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany

No Drawing. Filed Aug. 25, 1969, Ser. No. 852,919
Claims priority, application Germany, Aug. 27, 1968, P 17 95 238.4
Int. Cl. C08g *45/06*
U.S. Cl. 260—830 TW **7 Claims**

An epoxy resin composition comprising the reaction product of an amino compound containing at least two amino groups per molecule and an epoxide mixture of (a) from 30–90% by weight of a liquid diglycidyl ether of an aromatic compounud having at least two



groups per molecule wherein $\geqslant C_{ar}$ is a carbon atom belonging to an aromatic system, and (b) from 70–10% by weight of a liquid nitrogen linked glycidyl containing compound having at least two glycidyl groups per molecule. The process comprises reacting at about ambient temperatures the above reaction components and permitting the reaction product to cure.

3,647,919
FLEXIBLE PHENOLIC RESINS

Sung Ki Lee, Niagara Falls, N.Y., assignor to Hooker Chemical Corporation, Niagara Falls, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 569,043, Aug. 1, 1966. This application Dec. 29, 1969, Ser. No. 888,838
Int. Cl. C08g *37/16*
U.S. Cl. 260—842 **17 Claims**

Flexible phenolic resins useful for interior can coatings, drum and pail linings, wire coatings, laminating resins, baking primers, adhesives, pipe coatings, phenolic molding resins, foundry resins and the like are produced by the method comprising the steps of:

(1) reacting a polymer containing alpha beta carbon-to-carbon unsaturated carbonyl function with a nucleophilic compound having at least two active hydrogens to form a polymer containing an active pendent nucleophilic group containing at least 1 active hydrogen,

(2) reacting the resultant nucleophilic group containing active hydrogen on the said polymer with an aldehyde to form a polymer containing an active pendent methylol derivative group,

(3) reacting said pendent methylol group with an aromatic compound containing an ortho-para activating group to form a modified polymer containing a pendent arylalkylene group containing at least one nuclear hydrogen capable of further condensation with an aldehyde,

(4) recovering the polymer so produced.

3,647,920
POLYETHYLENE AS A LUBRICANT FOR POLYIMIDES OF 3,4-DICARBOXY - 1,2,3,4-TETRAHYDRO - 1 - NAPTHALENE SUCCINIC DIANHYDRIDE AND A DIAMINE

Roland Ralph Di Leone, Rowayton, Conn., assignor to American Cyanamid Company, Stamford, Conn.

No Drawing. Filed Oct. 27, 1970, Ser. No. 84,455
Int. Cl. C08g *41/04*
U.S. Cl. 260—851 PI **10 Claims**

A composition of matter comprising a thermoplastic polyimide of 3,4-dicarboxy-1,2,3,4-tetrahydro-1-naphthalene succinic dianhydride and a diprimary diamine containing small quantities of thermoplastic polyethylenes.

3,647,921

AROMATIC SUPERPOLYESTER-STYRENE POLYMER MELT STABILIZED COMPOSITION

Alvin F. Berry, Center Berlin, N.Y., assignor to General Electric Company

No Drawing. Filed Mar. 18, 1970, Ser. No. 20,826
Int. Cl. C08g *39/10, 51/28*
U.S. Cl. 260—873 10 Claims

The invention relates to an aromatic, substantially linear superpolyester possessing substantially improved melt stability properties. The polyesters contemplated by the invention are of an aromatic dicarboxylic acid and a dihydric phenol, and preferably polyesters having p-phenylene isophthalate units alone or interspersed with p-phenylene terephthalate units. Such polyesters are stabilized in accordance with the invention by addition of a styrene polymer in an amount sufficient to provide preferably from about 1 to 10% by weight styrene in the polyester composition.

3,647,922

MIXTURES OF POLYOLEFINS OF HIGH IMPACT STRENGTH HAVING AN IMPROVED TRANSPARENCY

Hans-Joachim Leugering, Frankfurt am Main, and Helmut Schaum, Bad Soden, Taunus, Germany, assignors to Farbwerke Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

No Drawing. Filed June 13, 1969, Ser. No. 833,196
Int. Cl. C08f *29/12*
U.S. Cl. 260—876 B 4 Claims

The present invention relates to thermoplastic moulding compositions, consisting of two components in a determined mixing ratio, one component being polyethylene having a melt index i_2 (at 190° C.) within the range of from 0.4 to 80 and the other component being a sequenced copolymer of propylene and ethylene having a melt index i_{10} (at 190° C.) within the range of from 0.5 to 60. Furthermore, the present invention provides a process for the manufacture of these moulding compositions.

The mixtures in accordance with the invention can be processed to shaped articles which are distinguished by an improved impact strength at low temperatures and an improve transparency, while having substantially the same hardness.

3,647,923

RESIN COMPOSITIONS CONTAINING HINDERED PHENOLS

Stanley M. Hazen, Cheswick, and William J. Heilman, Allison Park, Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

No Drawing. Filed July 15, 1968, Ser. No. 744,669
Int. Cl. C08f *3/02, 15/02, 15/04*
U.S. Cl. 260—878 9 Claims

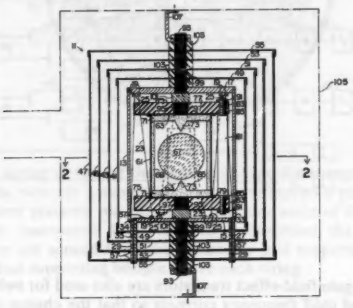
The shelf life of a liquid curable resin system is increased by the addition of a hindered phenol, such as 2,6-ditertiarybuylphenol or 2,6-ditertiarybutyl-p-cresol. The liquid curable resin system comprises a copolymer of maleic anhydride and an alpha-olefin such as hexene-1; a liquid unsaturated monoepoxide such as glycidyl acrylate or glycidyl methacrylate; and styrene. The system preferably contains less than 10 p.p.m. of water.

ELECTRICAL

3,647,924
HIGH-TEMPERATURE FURNACE FOR MELTING MATERIALS IN SPACE

John R. Rasquin, Madison, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration

Filed Feb. 12, 1971, Ser. No. 114,848
Int. Cl. F27b *5/08*; H05b *3/00*
U.S. Cl. 13—20 8 Claims

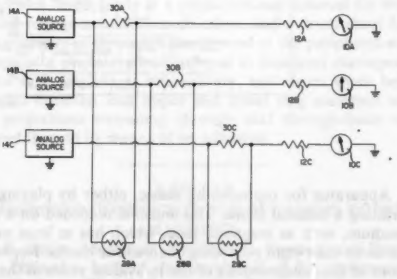


An electrically powered furnace for melting high-melting point materials in the vacuum and zero gravity environment of space comprising an alumina crucible, cylindrical in shape, and enclosing a cylindrical tantalum sample holder that contains the sample to be melted. The crucible is surrounded by concentric cylindrical enclosures made of polished sheet molybdenum. The sample holder is clamped between a pair of round plates and a pair of alignment bolts are joined to the circular plates and extend along the longitudinal axis of the furnace through the end covers of the crucible and surrounding concentric enclosures.

3,647,925
VARIABLE IMPEDANCE GENERATOR

Arthur G. Schilling, South Dayton, Fla., assignor to General Electric Company

Filed May 22, 1969, Ser. No. 826,983
Int. Cl. G09b *9/00*
U.S. Cl. 35—13 2 Claims

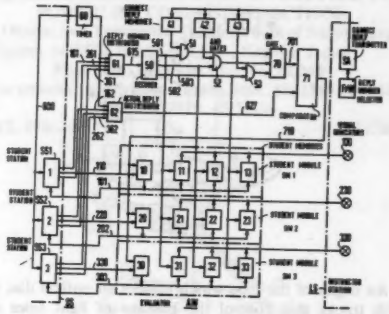


A photoconductive device is positioned adjacent to a light source with a radiation barrier between them. The radiation barrier has slots, and is rotated, causing light to alternately impinge upon the photoconductive device and to be blocked resulting in alternating decreases and increases in the impedance of the device. By using slots of random width and random spacing, the impedance variation introduced into a circuit simulates noise.

3,647,926
TEACHING SYSTEM FOR PROGRAMMED CLASS AND INDIVIDUAL TEACHING

Ebbe Rohloff, and Richard Lorenz, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Aug. 6, 1970, Ser. No. 61,736
Claims priority, application Germany, Aug. 7, 1969, P 19 40 127.5
Int. Cl. G09b *7/02*
U.S. Cl. 35—48 R 30 Claims



An instructor station for questioning a number of students with questions each of which is answerable by each of the students by a selected one of at least two possible answers provided for each student. The instructor station has a correct reply transmitter for providing the correct reply to each question, a number of signal indicators corresponding to the number of students each corresponding to a specific one of the students, and a reply number selector. Each of a plurality of similar student stations is electrically connected to the instructor station and has an actual reply selector and reply transfer key, signal indicators for evaluating the selected answer and for conveying instructions from the instructor station and a reply number selector for indicating the number of a question answered. And an evaluator is connected between the instructor station and each of the student stations for evaluating the replies selected by the students. The evaluator comprises a plurality of actual reply memories of the same number as the number of student stations connected to the instructor station for recording the correct replies to the questions supplied from the instructor station, a reply number distributor connected to each of the student stations, an actual reply distributor connected to each of the student stations, a timer connected between each of the student stations and each of the distributors for scanning the student stations and controlling the distributors accordingly, a comparator for comparing the replies selected by the students with the correct replies to the questions and providing a comparison result, a decoder and gates coupling the reply number distributor to the actual reply memories and to an input of the comparator, the actual reply distributor being connected to the other input of the comparator, a plurality of student memories connected to the output of the comparator, the student memories comprising a number of groups of

memories equal to the number of student stations, each group of memories including a number of memories equal in number to the number of questions, and connectors connecting the student memories to the signal indicators of the instructor station and to the signal indicators of each of the student stations.

3,647,927

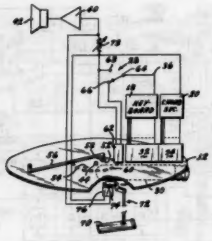
ELECTRONIC ORGAN WHEREIN MUSICAL SOUNDS AND A TREMOLO EFFECT ARE PROVIDED BY ELECTRO-OPTICAL APPARATUS

Richard S. Chang, Rolling Hills Estates; Stanley Cutler, Van Nuys; Harvey W. La Branche, Palos Verdes Peninsula; Marshall B. Pearlman; John W. Ryan, and M. Raymond Toy, Los Angeles, all of Calif., assignors to Mattel Inc., Hawthorne, Calif.

Filed Dec. 11, 1970, Ser. No. 97,214

Int. Cl. G10h *1/02, 3/06*

U.S. Cl. 84—1.18 **8 Claims**



An organ of the type which utilizes an optical disc record with tracks that control the passage of light from a light source to photocells to create musical sounds, wherein the disc also has a synchronizing track to indicate the beginning of musical measures on certain music tracks and a tremolo track for creating a tremolo effect. A light-transmitting conduit has one end positioned to pick up light passing through the synchronizing track and an opposite end facing a musician seated at the organ keyboard, to provide a flash of light which can be seen by the musician at the beginning of each measure of certain musical tracks. A resistance photocell is positioned opposite the tremolo track and is connected between the photocells of the music track and the organ speaker, to provide a rapid variation in the volume of music.

3,647,928

ELECTRICAL MUSICAL INSTRUMENT WITH ENSEMBLE AND CHIEF EFFECTS AND UNEQUAL STEREOPHONIC OUTPUTS

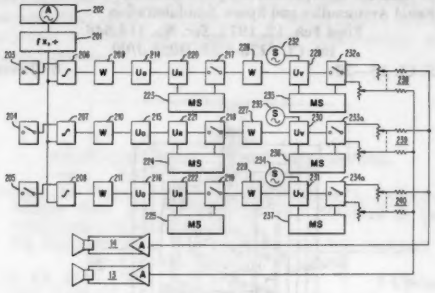
William D. Turner, 108 Manchester Avenue, Moylan, Pa.

Continuation-in-part of application Ser. No. 713,594, Mar. 18, 1968, now abandoned. This application Mar. 16, 1970, Ser. No. 19,641

Int. Cl. G10h *1/02, 1/04*

U.S. Cl. 84—1.24 **21 Claims**

An electrical musical instrument for simulating pipe organs, and having a natural ensemble effect, spatial tone-distribution effect, air turbulence effect, wind-pressure-change effect, tracker-keying effect, piano voice keying effect, and exact differently modulated harmonic pitch registers for mutation and compound stops and chiff. These effects are achieved by modulator units coupled between harmonic filtered, tone frequency current sources and a stereophonic amplifier-speaker system which produces outputs having levels of amplitudes which vary differently with respect to each other. The outputs connected to the two speakers have inequalities in amplitudes so that each tone has its own distinctive spatial location. The modulator units comprise insulated gate field-effect transistors which are utilized to modulate the tone frequency currents with different patterns of subsonic frequencies including those producing the simulation of natural air turbulence and wind pressure change. In-



sulated gate field-effect transistors are also used for switching tone and chiff frequency currents so that the change in amplitude is sigmoid during turn-on and turnoff. RC circuitry in combination with the switching insulated gate field-effect transistors permit tracker keying and piano voice keying.

3,647,929

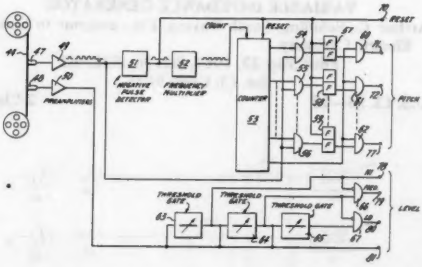
APPARATUS FOR REPRODUCING MUSICAL NOTES FROM AN ENCODED RECORD

Karl F. Milde, Jr., 198 Baltic Street, Brooklyn, N.Y.

Continuation-in-part of application Ser. No. 756,857, Sept. 3, 1968. This application Oct. 8, 1970, Ser. No. 79,045

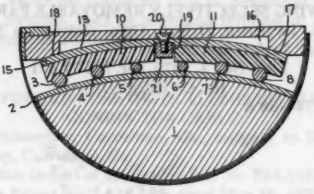
Int. Cl. G10h *1/00*

U.S. Cl. 84—1.01 **2 Claims**



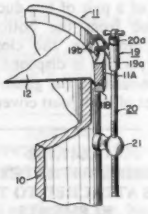
Apparatus for reproducing music, either by playing or by printing a musical score. The music is recorded on a record medium, such as magnetic tape, which has at least one and no more than eight recording channels or tracks. Representations of the fundamentals of the individual notes of the music are recorded on the record medium without inclusion of representations of the harmonics of these notes. The reproducing apparatus, according to the invention, includes the combination of means for reading the representations of the fundamentals, means for decoding these representations and means for receiving the decoded representations and reproducing the musical notes.

3,647,930
TUNING DEVICE
August Hermann Wowries, Oskar-Hoffmann Str. 162, 463 Bochum, Germany
Filed July 7, 1969, Ser. No. 839,441
Claims priority, application Germany, July 8, 1968, P 17 72 817.5
Int. Cl. G10d 3/00
U.S. Cl. 84—318 3 Claims



A tuning device of the capo-tasto-type for stringed instruments, wherein a supporting crossbeam carries a plurality of resilient pressure pieces, each contacting some of the strings of the instrument. In a preferred embodiment, the pressure pieces are spaced from the crossbeam and supported by individual supporting bridges above each string.

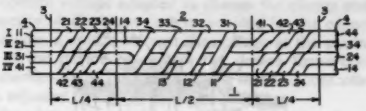
3,647,931
DRUMHEAD
Yoshiyuki Koishikawa, 2365 Kawarada-cho, Mil Prefecturo, Yokkaichi, Japan
Filed Nov. 16, 1970, Ser. No. 89,975
Int. Cl. G10d 13/02
U.S. Cl. 84—411 4 Claims



A drumhead comprising an upper ring member and a lower ring member which are provided on the confronting surfaces thereof with a plurality of projections and a plurality of recesses respectively at a predetermined interval for interlocking engagement with each other, and a drum sheet having a plurality of through-holes formed in the peripheral edge portion at a predetermined interval at locations corresponding to said projections respectively, said drum sheet being clamped between said upper and lower ring members with said projections extending through said through-holes and secured thereto by means of an adhesive.

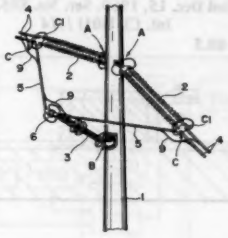
3,647,932
TRANSPOSED CONDUCTOR FOR DYNAMOELECTRIC MACHINES
Paul R. Heller, Murrysville; William C. Brenner, and Harold M. Philosky, both of Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Dec. 11, 1970, Ser. No. 97,278
Int. Cl. H01b 7/30
U.S. Cl. 174—34 12 Claims

A transposed stranded conductor for dynamoelectric machines having four stacks of strands transposed in the slot portion of the conductor in such a manner that each stack moves to different transverse positions in successive longitudinal sections of the bar such that the stacks are reversed in transverse position at opposite ends of the bar. Preferably,



the strands are also transposed in a manner to cause inversion of the relative strand positions at opposite ends of the slot so that the conductor is fully transposed with inversion of strand position both transversely of the slot and depthwise of the slot.

3,647,933
JUMPER ASSEMBLY CONNECTING TOGETHER TWO POWERLINE CONDUCTOR SECTIONS
Toru Okada, and Toshimitsu Takatori, both of Nagoya, Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan
Filed Sept. 15, 1970, Ser. No. 72,260
Claims priority, application Japan, Sept. 19, 1969, 44/74218; Mar. 17, 1970, 45/22106
U.S. Cl. 174—43 13 Claims

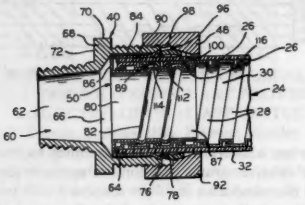


A pair of powerline conductors are connected together by a jumper assembly comprising a tower structure, tension insulator strings connecting the line conductors to the tower, a jumper conductor electrically connecting the line conductors, which jumper conductor consists of rigid and/or flexible conductor members, and one or more support insulator beams secured to the tower in a manner swayable both in the horizontal and vertical directions for holding the jumper conductor from slantwise lower direction.

3,647,934
LIQUIDTIGHT CONNECTOR
Terry J. Hurtt, Aurora, Ill., assignor to All-Steel Equipment Inc.
Filed Mar. 5, 1970, Ser. No. 16,696
Int. Cl. H02g 3/06
U.S. Cl. 174—65 R 4 Claims

A liquidtight connector for connecting sheathed flexible conduit to switch or outlet boxes and the like in which the cutoff end of the conduit has applied thereto a ferrule that has a threaded connection with the conduit and defines an outer portion which is received over the conduit sheathing and terminates in an outwardly flared lip. The ferrule covered end of the conduit is received within one end of the connector body, with the ferrule being proportioned such that its lip seats against the terminal portion of the said connector one end. A contractable gland received over the con-

duit is clamped by a seal nut against the lip of the ferrule to contract same into liquidtight relation with the conduit. The other end of the connector body is secured to the box by a conventional lock nut in the case of knockout openings with



an O-ring seal and retainer therefore being employed between the box wall and the connector body, and in the case of hub-type openings, the other end of the connector body is applied directly thereto.

3,647,935

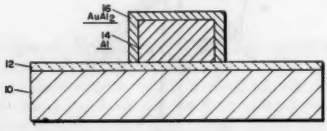
INTERMETALLIC PASSIVATION OF ALUMINUM METALLIZATION

Elliott M. Philofsky, and Kim Ritchie, both of Phoenix, Ariz., assignors to Motorola, Inc., Franklin Park, Ill.

Filed Dec. 15, 1969, Ser. No. 885,181

Int. Cl. H01l 1/14

U.S. Cl. 174—68.5 **5 Claims**



An electrically conductive intermetallic coating which is resistant to corrosion serves as a passivating layer on an aluminum metallization. The preferred intermetallic is $AuAl_2$. The intermetallic passivating layer protects the aluminum metallization from chemical attack thereby increasing device lifetime and stability.

3,647,936

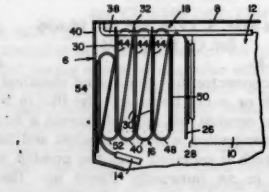
SELF-FOLDING CABLE CARRIER

Charles J. Dryg, Los Gatos, Calif., assignor to Iomec, Incorporated, Santa Clara, Calif.

Filed Apr. 6, 1970, Ser. No. 25,773

Int. Cl. H01b 7/06

U.S. Cl. 174—69 **9 Claims**



An apparatus for folding a length of cable interconnecting electrical components mounted to a chassis and to a drawer movably supported by the chassis. When the drawer is retracted the cables are arranged in closely adjacent loops with movable support cards carrying halves of the loops. Withdrawal of the drawer pulls the loops apart in the direction of movement of the drawer and pivots the cards towards their mutual alignment to thereby increase the effective length of the cable loop according to the spacing between the drawer and the chassis.

3,647,937

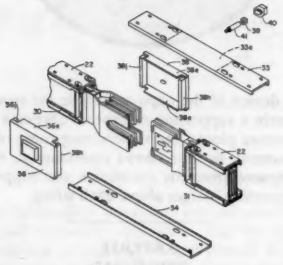
WEATHERPROOF BUS DUCT JOINT STRUCTURE HAVING SELECTIVELY REMOVABLE PARTS

George N. Jorgensen, Oxford, Ohio, assignor to Square D Company, Park Ridge, Ill.

Filed Oct. 2, 1970, Ser. No. 77,671

Int. Cl. H02g 3/28

U.S. Cl. 174—88 B **3 Claims**



The joint structure includes a pair of joint tie channels with gaskets and a pair of joint covers with gaskets, one of the joint covers having a captive nut and the other of the joint covers having a removable closing cap for providing access to a joint bolt threaded into the captive nut. For horizontal edgewise mounting of a pair of bus duct sections, the gasket material is removed from the bottom tie channel. For horizontal flatwise mounting, the closing cap is removed from its joint cover, which is disposed at the bottom of the joint. For vertical mounting, the gasket material is removed from the lower edges of both joint covers.

3,647,938

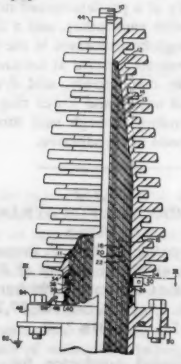
CONDENSER BUSHING WITH FLEXIBLE CONDUCTOR CONNECTIONS ATTACHED TO THE CONDENSER ELEMENTS

Elmer J. Grimmer, Sharpsville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 24, 1971, Ser. No. 127,653

Int. Cl. H01b 17/28

U.S. Cl. 174—143 **3 Claims**



A condenser bushing comprising layers of insulation material wound about a central conductor. Conductive con-

denser elements or foils are placed between layers of the insulation at properly determined radially spaced intervals throughout the buildup of layers of electrical insulating material. A conductor is attached to the conductor foils or condenser elements when they are placed in position between the layers of electrical insulation. The conductor is wound between the layers of insulation and played along with the insulation at a slight displacement of each turn of the conductor and fed out beyond the last turn of the electrical insulation where the conductor may be connected to an appropriate terminal, such as a ground terminal or potential tap, or to another conductive layer.

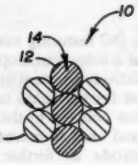
3,647,939
REINFORCED COMPOSITE ALUMINUM ALLOY CONDUCTOR CABLE

Roger J. Schoerner, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.

Continuation-in-part of application Ser. No. 814,198, Apr. 7, 1969, now Patent No. 3,513,251, dated May 19, 1970, which is a continuation-in-part of application Ser. No. 779,376, Nov. 27, 1968, now abandoned , which is a continuation-in-part of application Ser. No. 730,933, May 21, 1968, now abandoned. This application May 15, 1970, Ser. No. 37,726

Int. Cl. H01b *5/08*

U.S. Cl. 174—128 **18 Claims**



A multistrand cable for transmission of electrical power including aluminum alloy strands having a minimum electrical conductivity of 61 percent IACS and at least one strand of high-strength material with a maximum conductivity of less than 61 percent IACS.

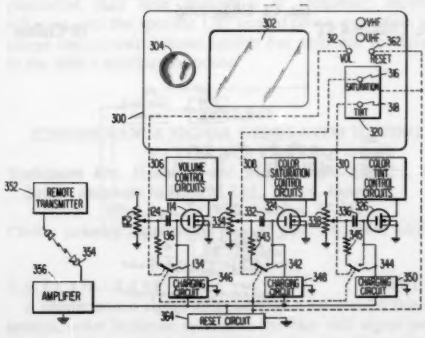
3,647,940
CONTROL SYSTEM

Leopold A. Harwood, 800 Summit Ridge Drive, Somerville, N.J.

Continuation-in-part of application Ser. No. 733,640, May 31, 1968. This application Dec. 1, 1970, Ser. No. 93,992

Int. Cl. H03k *25/02*

U.S. Cl. 178—5.4 R **21 Claims**



A semiconductor device has a first and a second electrode interconnected with circuit means to form an electric circuit operable to control functions in an electric apparatus by changes in the conductivity of the first-second electrode current path. The device control electrode, which exhibits a high-input impedance, is coupled by a capacitor to a source cause potential. The capacitor is additionally connected to a source of control voltage adapted to change the charge state of the capacitor. A discharge path is provided for the capacitor and includes a switch to reset the voltage at the control electrode of the device to control the device first-second electrode current path conductivity such that the controlled function is adjusted to a predetermined condition.

A plurality of circuits may be provided to control a plurality of functions in an apparatus. In such case, means are included for simultaneously actuating the switch means associated with each of the plurality of circuits so that the conductivity of the first-second electrode current path of the devices are simultaneously brought to reference levels which case the controlled functions to be simultaneously adjusted to predetermined conditions.

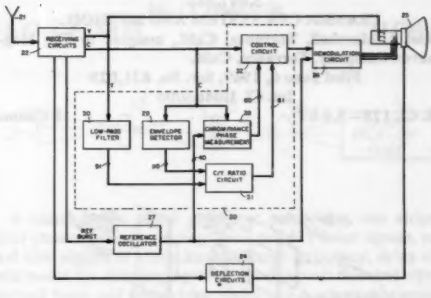
3,647,941
COLOR MODIFICATION APPARATUS FOR A COLOR TELEVISION SYSTEM

Philip Andrade, Long Island City, and Thaddeus V. Rychlewski, Seneca Falls, both of N.Y., assignors to Sylvania Electric Products Inc.

Filed Nov. 5, 1969, Ser. No. 874,271

Int. Cl. H04n *9/02*

U.S. Cl. 178—5.4 HE **14 Claims**



An apparatus for modifying the displayed appearance of preselected colors presented on a color television screen without changing the appearance of other colors in the same picture. The apparatus detects and modifies chrominance signals which correspond to these preselected colors. In one embodiment of the invention the saturation level of all colors except flesh tones is boosted.

3,647,942
VIDEO COLOR SYNTHESIZER

Eric J. Siegel, c/o Tom Tadlock 2143 Pine Street, San Francisco, Calif.

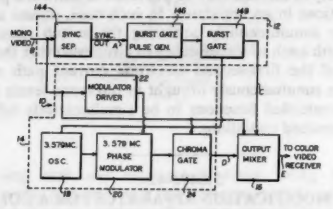
Filed Apr. 23, 1970, Ser. No. 31,090

Int. Cl. H04n *9/02*

U.S. Cl. 178—5.4 **15 Claims**

An apparatus for synthesizing pseudocolor video signals from composite monochromatic video signals. Means are provided for producing a color burst signal on the back porch of the pseudocolor video signal from a monochromatic horizontal sync pulse. Such means includes a color subcarrier oscillator, a pulse generator which stretches the horizontal sync pulse to accommodate the proper period of the subcar-

rier frequency and slightly delay its occurrence, and a burst gate which produces the burst frequency from the subcarrier and stretched pulses. A pseudochrominance portion of the color video signal is produced by means which phase modulate the color subcarrier with the monochromatic video signal to produce a pseudohue signal and mix this hue signal with the video information portion of the monochromatic



signal. An output mixer is also provided for mixing this pseudochrominance signal with the color burst and the monochromatic video signal to provide the pseudocolor video signal. Upon reception by a color video receiver, the monochromatic picture is reproduced in subjective color, the hues therein varying in accordance with the changes in the gray level of the monochromatic video information.

3,647,943

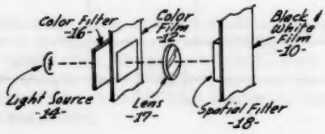
TRANSDUCER SYSTEM AND METHOD

Daniel J. Marshall, Torrance, Calif., assignor to The Magnavox Company, Torrance, Calif.

Filed June 6, 1969, Ser. No. 831,029

Int. Cl. H04n *9/06*

U.S. Cl. 178—5.4 ST **18 Claims**



This invention relates to a system for, and method of, reproducing a color image from a composite black-and-white image. The composite black-and-white image is formed either on an exposure or is formed from a live image. In either case, modulations are provided in a first particular line pattern to obtain a representation of a first particular color. Modulations are also provided in a second particular line pattern different from the first particular line pattern to obtain a representation of a second particular color. The third color may be unmodulated. The three colors add optically to form the image luminance.

To reproduce the color image, signals are provided by scanning the composite image. Means are provided for operating upon such signals in accordance with the modulations in the first particular line pattern to produce signals representing the first particular color. Means are also provided for operating upon the signals representing the composite image in accordance with the modulations in the second particular line pattern to produce signals representing the second particular color. The signals representing the first and second particular colors are then used in conjunction with the luminance to reproduce the color image.

3,647,944

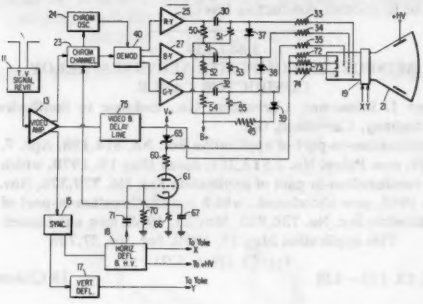
KINESCOPE BIAS ARRANGEMENT TO PROVIDE BOTH CONSTANT AMPLITUDE DC RESTORATION PULSES AND ARC DISCHARGE PROTECTION

George Edward Anderson, Indianapolis, Ind., assignor to RCA Corporation

Filed Aug. 25, 1969, Ser. No. 852,639

Int. Cl. H04n *5/18*

U.S. Cl. 178—5.4 R **8 Claims**



A pulse applied to DC restoring networks associated with the grid electrodes of a color kinescope for biasing the same is maintained at a relatively constant amplitude. The constant amplitude is provided for by means of a unidirectional current-conducting device coupled to the output electrode of a blanking amplifier, and used to control the pulse amplitude at the output electrode as further applied to the DC restorers. The unidirectional device limits the voltage excursions of the pulse when the device is caused to conduct, due to the bias impressed thereon. The action serves to regulate the bias voltage applied to the kinescope grids via the DC restoring networks independent of amplitude variations in the pulse as applied to the input electrode of the blanking amplifier and amplitude variations due to tolerances and aging of the blanking amplifier associated components.

3,647,945

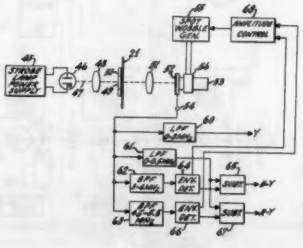
COLOR ENCODING SYSTEM UTILIZING TWO FILTERS ALTERNATELY FOR MINIMIZING EFFECTS OF IMAGE MISREGISTRATION AND IMAGE PICKUP DEVICE LAG

William James Hannan, Pennington, N.J., assignor to RCA Corporation

Filed Sept. 30, 1969, Ser. No. 862,224

Int. Cl. H04n *9/06*

U.S. Cl. 178—5.4 ST **10 Claims**



Apparatus is provided for enabling color images to be recorded on black and white motion picture film and subsequently displayed in full color on a television monitor. Dif-

ferent color-encoding filters yielding the same frequency color carrier waves having different phase relationships are moved into the optical path on alternate frames for producing color representative signals, which, when averaged over several horizontal scanning lines, reduce the undesirable effects of vidicon lag and frame-to-frame misregistration.

3,647,946

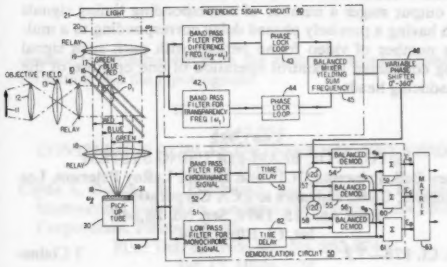
SINGLE-TUBE COLOR TV CAMERA USING 120° PHASE SEPARATION

Louis H. Enloe, Colts Neck, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 10, 1969, Ser. No. 883,899

Int. Cl. H04n *9/06*

U.S. Cl. 178—5.4 ST **3 Claims**



An optical system spatially modulates three individual primary-color images onto a common spatial carrier frequency with 120° phase separation. Electron beam scanning of a single tube converts the spatially modulated image to an electrical output signal composed of an average value and a chrominance signal consisting of three modulated waves at a single electrical color carrier frequency separated in phase by 120°. Since the scan velocity varies, the frequency of the electrical color carrier is modulated by the velocity. A signal having the same modulation is used as a reference for phase demodulation of the chrominance signal to produce three individual components. The average value of the output signal, which represents the monochrome, is combined with each of the individual components to form three independent signals, each representative of one of the primary images. The phase demodulation technique requires substantially lower spatial resolution than time sequential or frequency separation schemes, and the specific 120° spatial phase separation of the image components insures against hue shift due to variations in the tube's aperture response.

3,647,947

CHROMINANCE SIGNAL GENERATOR HAVING A PATTERNED FILTER

Yoshizumi Eto, Hachioji, and Masao Hibi, Kodaira, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

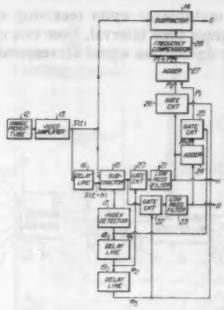
Filed Apr. 3, 1970, Ser. No. 25,315

Claims priority, application Japan, Apr. 11, 1969, 44/27655; 44/27656

Int. Cl. H04n *9/06*

U.S. Cl. 178—5.4 ST **11 Claims**

A chrominance signal generator used for a color television system, color facsimile system or the like, said signal generator including a striped or latticed special color filter placed in front of an image pickup tube to generate a composite chrominance signal and a signal processing system for separating three component primary color signals from the said composite signal, the said signal processing system being designed on the basis of the hypothesis of the close correlation between consecutive horizontal scanning lines of an image.



3,647,948

CHROMINANCE SIGNAL GENERATOR HAVING STRIPED FILTER

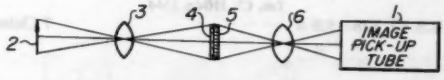
Yoshizumi Eto, Hachioji, and Masao Hibi, Kodaira, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 2, 1970, Ser. No. 25,207

Claims priority, application Japan, Apr. 4, 1969, 44/25544; 44/25545

Int. Cl. H04n *9/06*

U.S. Cl. 178—5.4 ST **13 Claims**



A chrominance signal generator comprising two striped filter elements for generating three primary color signals, red and blue signals of which have different frequency, delay circuit means for delaying a part of the composite electric signal derived from said filter elements for one horizontal scanning period, signal processing circuit means including an adder and a subtractor for processing the output signal of said delay circuit and said composite electric signal to obtain the three primary color signals, utilizing the vertical correlation of an image.

3,647,949

VIDEO MULTIPLEXING SYSTEM

Felix H. Closs, Adliswill, Zurich; Dieter Seitzer, Gattikon, Zurich, and Peter Stucki, Adliswil, Zurich. all of Switzerland, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 23, 1969, Ser. No. 835,437

Claims priority, application Switzerland, July 12, 1968, 10498/68

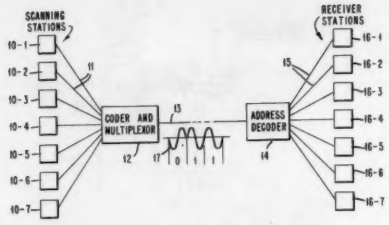
Int. Cl. H04n *7/68*

U.S. Cl. 178—5.6 **17 Claims**

A system is provided for the simultaneous transmission of pictures between a plurality of scanning stations and a plurality of corresponding receiver stations. The pictures to be transmitted comprise two levels of brightness such as, for example, a document having black print on a white background. Each of the scanning stations scans, in a pseudorandom fashion, its respective picture to provide an output signal indicative of the information on one of the levels of

brightness, as for example, the black print information on the document. This information output signal is then multiplexed.

A coder and multiplexer upon receiving an information signal, during a given time interval, from one of the scanning stations generate an address signal corresponding to the address of the station providing the information signal whereupon the address signal is transmitted to a decoder at the receiving end for decoding and providing an information signal to the appropriate receiver. When the coder and multiplexer simultaneously receive information signals from two scanning stations within a given time interval a priority control circuit selects one of the signals.

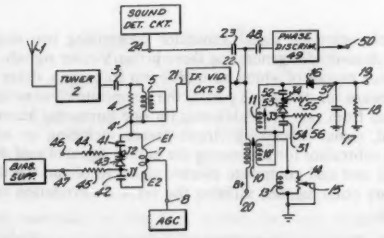


3,647,950

VARIABLE TRAP DEVICE FOR TELEVISION RECEIVERS AND THE LIKE

Sadayoshi Yoshikawa, Osaka, Japan, assignor to New Nippon Electric Co., Ltd., Osaka, Japan

Filed Feb. 27, 1969, Ser. No. 802,804
Claims priority, application Japan, June 26, 1968, 43/43857
Int. Cl. H04n *5/44*
U.S. Cl. 178—5.8 A **7 Claims**



An intermediate-frequency video amplifier circuit in which trap circuits are provided to attenuate sound components in intermediate-frequency video signals. Frequency variations in the intermediate-frequency video signals are detected and converted into control signals which control the tuning of the trap circuits which are thereby adjusted to attenuate the sound components despite variations in the frequency thereof.

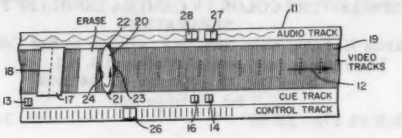
3,647,951

EDIT CONTROL CIRCUIT FOR VIDEO TAPE RECORD SYSTEM

Marshall G. Rose, Jr., Cupertino, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Nov. 9, 1970, Ser. No. 87,905
Int. Cl. G11b *5/02, 27/08;* **H04n** *5/78*
U.S. Cl. 178—6.6 A **4 Claims**

In order to allow for an unlimited number of short duration edits on a video tape recorder of the type having physically separated video record/reproduce and erase heads, a multistage electronic shift register clocked at the video signal frame rate is employed to develop the necessary timing signals for operating the various head assemblies at the proper times in response to a common edit command signal. The input to the shift register receives an edit pulse signal of desired duration and in response thereto develops at its various output stages a number of corresponding timing signals each having a precisely phased delay corresponding to a multiple number of video frame periods with each such signal being connected to control operation of one or more of the transducing heads.

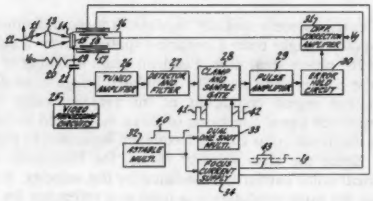


3,647,952

AUTOMATIC BEAM-FOCUSING SYSTEM

Henry Ball, Princeton, N.J., and Harold LeRoy Peterson, Los Angeles, Calif., assignors to RCA Corporation

Filed Apr. 15, 1970, Ser. No. 28,647
Int. Cl. H04n *5/34*
U.S. Cl. 178—7.2 **7 Claims**



A modulating component is added to a beam-focusing parameter such as a focusing electrode potential or a focusing parameter such as a focusing electrode potential or a focusing coil current utilized in conjunction with an image pickup device. A modulation component derived from a video output terminal of the image pickup device is detected and utilized for providing a beam-focusing error correction signal which controls the beam-focusing parameter.

3,647,953

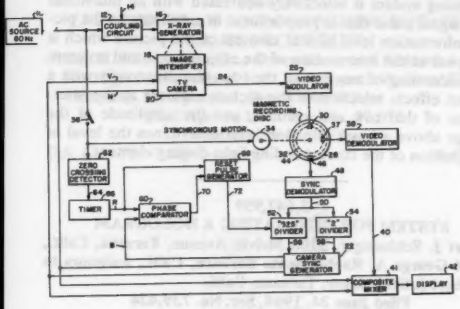
SYSTEM FOR PHASING RECORDED INFORMATION WITH INPUT SIGNALS

Clyde A. Booker, Jr., Pittsburgh, and Francis T. Thompson, Murrysville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 6, 1969, Ser. No. 863,830
Int. Cl. H04n *5/04, 5/32, 5/78*
U.S. Cl. 178—6.6 A **5 Claims**

A system for correlating recorded synchronizing signals, recorded on a magnetic recording disc, for example, with alternating input signals, utilized for driving the disc for example, wherein timing signals, such as vertical blanking signals provided in response to the recorded synchronizing information, are compared with reference signals, generated, for example, in response to a predetermined characteristic of the

input signals, to provide an output when an undesired relationship exists therebetween which is utilized to establish a



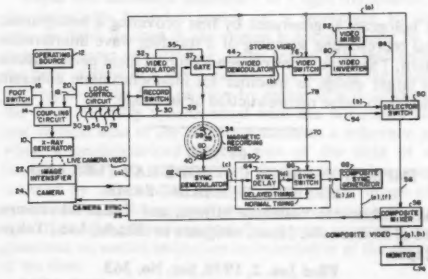
desired relationship between the recorded synchronizing information and the input signals.

3,647,954

CONTINUOUS DISPLAY ON INTERMITTENT VIDEO SIGNALS

Clyde A. Booker, Jr., Pittsburgh, and Francis T. Thompson, Murrysville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 6, 1969, Ser. No. 863,974
Int. Cl. H04n *5/78*
U.S. Cl. 178—6.6 A **6 Claims**



A system for the continuous display of live video information, for example, from a television camera scanning an X-ray image, and stored video information, which may comprise selected of the live video signals which are recorded in a recording media, wherein the synchronizing signals utilized for controlling the generation of the live video information and recording the stored information is controlled in time so as to correlate properly the live and stored video information to permit the comparison and continuous display thereof.

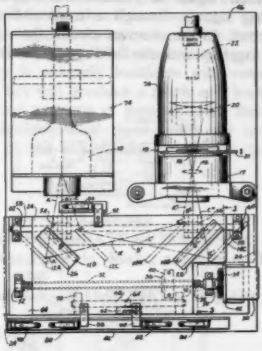
3,647,955

IMAGE TRANSMITTER USING MICROFILM POSITIVES OR NEGATIVES AS SOURCE

Malcolm Reader, New Hyde Park, L. I., N.Y.; John L. Tregay, Weston, Conn., and Charles Stern, Brooklyn, N.Y., assignors to Comfax Communications Industries, Inc., New York, N.Y.

Filed May 4, 1970, Ser. No. 34,334
Int. Cl. H04n *3/08*
U.S. Cl. 178—7.6 **7 Claims**

An image transmission system is disclosed in which the image is obtained from a reduced size medium such as microfilm. A scanning beam is incident upon a first reflector which causes the beam to be redirected onto a second reflector fixedly spaced therefrom. The second reflector in turn redirects the scanning beam onto the film. By moving the two



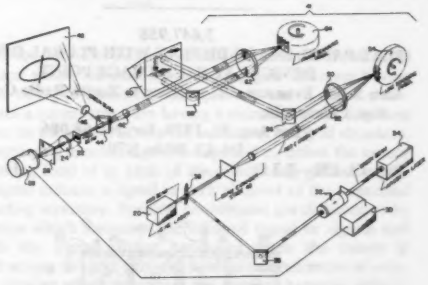
reflectors with respect to the source of the scanning beam by a relatively large distance, the scanning beam is moved by a much smaller distance over the plane of the film, to permit scanning over a new line on the film.

3,647,956

LASER BEAM FLYING SPOT SCANNER

Willard E. Buck, Lake Havasu City, Ariz., and Thomas E. Holland, Sunnyvale, Calif., assignors to Technical Operations, Incorporated, Burlington, Mass.

Filed Mar. 10, 1969, Ser. No. 805,754
Int. Cl. H04n *1/04, 3/08*
U.S. Cl. 178—7.6 **11 Claims**



This disclosure depicts laser beam flying spot flat field raster scanning systems employing orthogonally moved corner mirror trains to produce two dimensional spot motion. Imaging and relaying systems for use with such corner mirror trains are stressed.

3,647,957

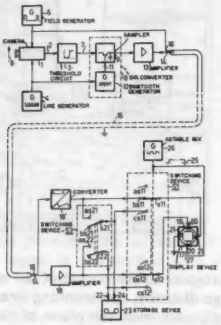
TRANSMISSION SYSTEM FOR THE TRANSMISSION OF CHARACTERS

Adrianus Johannes Wilhelmus Marie Van Overbeek, and Leendert Gerardus Krul, both of Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 15, 1969, Ser. No. 885,114
Claims priority, application Netherlands, Dec. 24, 1968, 6818585
Int. Cl. H04n *7/12*
U.S. Cl. 178—6.8 **10 Claims**

A transmission system for transmitting characters which are picked up by a television camera. The video signal produced is converted into a pulsatory signal each pulse of

which determines a black-to-white transition which signal is subsequently applied to a digital-to-analog converter which provides a signal varying in amplitude and comprising several samples which signal is transmitted together with field synchronizing signals through a transmission path to the receiver circuit. In the receiver circuit the signal varying in amplitude, together with the field synchronizing signals is applied directly or through a memory to a display device including a cathode-ray tube having two pairs of deflection means for deflecting an electron beam generated in the tube into two directions which are transverse to each other, a sawtooth signal of field frequency generated under the control of said field signals being applied as a time base to a first pair of deflection means and the signal varying in amplitude being applied to the second pair of deflection means.

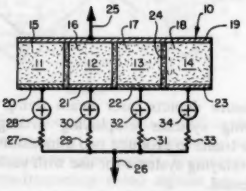


3,647,958

FLAT-PANEL IMAGE DISPLAY WITH PLURAL DISPLAY DEVICES AT EACH IMAGE POINT

Alan Sobel, Evanston, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Aug. 31, 1970, Ser. No. 68,086
Int. Cl. H04n *5/70*
U.S. Cl. 178—7.3 D **11 Claims**



An image-display panel is formed to present picture elements distributed over the panel in a matrix of rows and columns. At the position of each picture element is a light-display device capable of displaying light in an amount proportional to its level of energization. Associated with each device are a plurality of energizing systems each of which is responsive to a different input signal amplitude. Each system energizes its associated light-display device at a particular level. By varying the input signal amplitude, different numbers of the energizing systems are activated and the level of energization of the light-display device, and hence its output, is varied. The light-display devices are either light producers such as electroluminescent cells or light modulators such as liquid crystals.

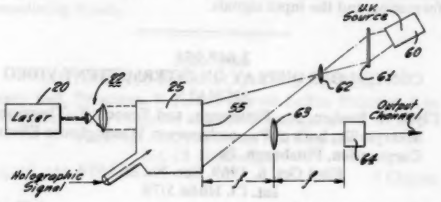
Enabling signals are selectively addressed to different rows of the energizing systems in response to row-selection signals. At the time that one row is selected, each column of the energizing system is selectively addressed with an individual input signal pulse that is proportional in amplitude to the picture information level of that element of the picture which is to appear at the intersection of the selected row and column. The addressing of any one of the rows simultaneously with a column effects selection of the picture element at the intersection of that row and column, and the amplitude of the voltage above a basic selection level determines the level of energization of the corresponding light-display element.

3,647,959

SYSTEM FOR GENERATING A HOLOGRAM

Robert J. Schlesinger, 5108 Melvin Avenue, Tarzana, Calif., and George A. Raabe, Santa Barbara, Calif., assignors to Robert J. Schlesinger, Tarzana, Calif.

Filed June 24, 1968, Ser. No. 739,424
Int. Cl. H04n *5/74;* **H01j** *29/14*
U.S. Cl. 178—7.87 **1 Claim**



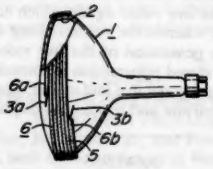
A hologram is generated by first providing a holographic signal representing scanning of a standing wave interference pattern. The signal controls generation of local perturbations in a target usable as modifier for monochromatic coherent radiation to cause reconstruction of an image.

3,647,960

IMPLOSION-PROOF CATHODE-RAY TUBE AND METHOD OF MAKING SAME

Takeo Takemoto; Yoshihiko Miyata, and Takao Kawamura, all of Mobara-shi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

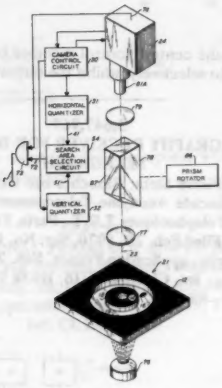
Filed Jan. 2, 1970, Ser. No. 363
Claims priority, application Japan, Jan. 6, 1969, 44/48
Int. Cl. H04n *5/64*
U.S. Cl. 178—7.82 **5 Claims**



An implosion proofing means including a conductor in the form of a metal wire or strip and a binder covering the conductor is disposed on a suitable portion of the outer peripheral face of the sidewall or the peripheral edge of the faceplate of the bulb of a cathode-ray tube and then current is supplied to the conductor to fuse the binder so that the implosion proofing means including the conductor core can be

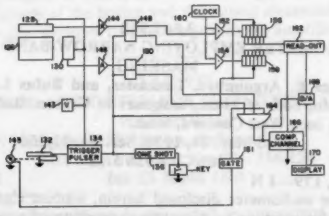
securely fixed to that portion of the bulb to provide an implosion-proof cathode-ray tube.

3,647,961
T.V. -AIDED FLAW DETECTION USING ROTATING IMAGE TECHNIQUES
Frank H. Blitchington, Jr., Greensboro, and Richard A. Harris, High Point, both of N.C., assignors to Western Electric Company, Incorporated, New York, N.Y.
Filed Apr. 9, 1970, Ser. No. 27,074
Int. Cl. H01j *29/89*
U.S. Cl. 178—7.85 **8 Claims**



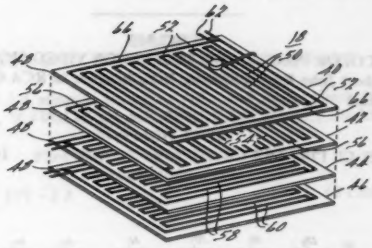
Rapid and automatic inspection of a light transparent, circumferentially bounded region of a workpiece to detect opaque flaws located in the region is accomplished by aligning the center of curvature of the region with the center of the field of view of a video camera and rotating the image of the region in the field of view by means of a dove prism or the like. Circuitry synchronized with the horizontal sweep and vertical scan of the camera establishes a reference pulse when a predetermined search area of the field of view located in the path of rotation of the annular region image is scanned by the camera. Upon rotation of the image of an opaque flaw in the region through the predetermined search area, the video pulse output of the camera coincidence gate generates an output indication representative of the presence of the flaw.

3,647,962
KEYBOARD ENCODING
Albert L. Whetstone, Southport, Conn., assignor to Science Accessories Corporation, Southport, Conn.
Filed July 30, 1970, Ser. No. 59,449
Int. Cl. H04l *17/12*
U.S. Cl. 178—17 C **8 Claims**



This invention relates to a keyboard encoding device for converting the data represented by a key in a keyboard to a digital representation. The device employs a plurality of keys each individually operable to provide an acoustic shock wave in the form of a spark. Receptors arranged about the perimeter of the keyboard respond to the leading edge of the shock wave. The time period between generation of the spark and reception thereof by the shock wave receptor is digitized by means of a counting device responsive to the initiation of the spark and to the receipt of the shock wave by the receptor. Since each key is uniquely locatable with respect to the receptor, each key will produce a spark at a location which will take differing amounts of time to reach their receptor. The various digitization of these times are indicative or representative of the information attributed to each key respectively.

3,647,963
AUTOMATIC COORDINATE DETERMINING DEVICE
Knight V. Bailey, Ferndale, Mich., assignor to The Bendix Corporation
Filed Mar. 10, 1969, Ser. No. 805,559
Int. Cl. G08c *21/00*
U.S. Cl. 178—19 **36 Claims**

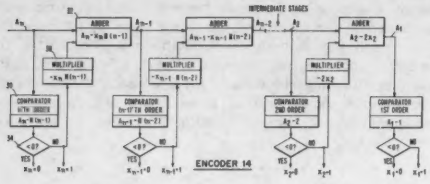


A device for determining position coordinates of points on a surface which includes a conducting grid structure having at least two grid elements to be placed over or under a surface and a cursor structure having a circular conducting loop element to be moved across the surface of the grid structure. An alternating electric signal is supplied to either the cursor conducting loop or to each of the conducting grid elements. This signal induces a signal in each element of the unexcited conducting structure. Position coordinates are determined by apparatus which measures the induced signal or signals and records the signal change produced when the cursor is moved across the grid surface. Several embodiments of measuring devices which determine the distance between arbitrary points on a surface such as a map, graph or photograph are illustrated. Automatic plotting embodiments are also shown and described in which the plotting motion is determined by comparing signals representing the measured loop position on the grid with a preselected set of command signals.

3,647,964
RUN-LENGTH-LIMITED CODING FOR MODIFIED RAISED-COSINE EQUALIZATION CHANNEL
Donald T. Tang, Yorktown Heights, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Feb. 24, 1970, Ser. No. 13,418
Int. Cl. H04l *25/08*
U.S. Cl. 178—68 **5 Claims**

To increase the rate at which data can be passed without intersymbol interference through an equalized low-pass channel of the raised-cosine-type each input digit sequence undergoes a preliminary encoding process that converts it into a corresponding run-length-limited sequence in which every

"1" digit is separated from every other "1" digit in the sequence by at least one intervening "0" digit. The digits of such a run-length-limited sequence can pass through a modified raised-cosine channel without intersymbol interference at a rate that is twice the maximum rate at which this channel can reliably pass the digits of sequences containing 1's in immediately adjacent positions.

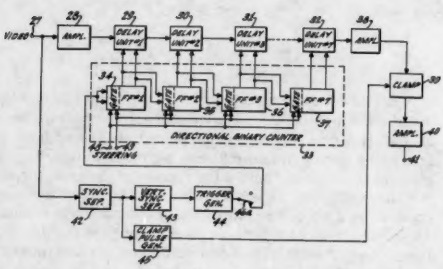


3,647,965

COLOR PHASER FOR TELEVISION VIDEO SIGNALS

Robert John Butler, Syosset, N.Y., assignor to RCA Corporation

Filed Apr. 1, 1969, Ser. No. 811,921
Int. Cl. H04n 9/46
U.S. Cl. 178—69.5 CB **10 Claims**



Color video signals are applied to a delaying channel, the output of which is maintained in phase with a reference color signal by means which compares the phase of the color burst of the delayed signal with the phase of the color burst of the reference signal and changes the amount of delay of the delaying channel until there is substantially no color phase error between the compared signals.

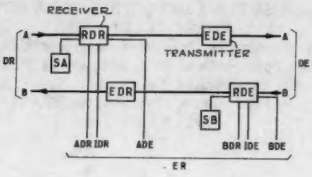
3,647,966

APPARATUS FOR CONNECTING TRANSMISSION CHANNELS

Roger Teurnier, Rueil-Malmaison, France, assignor to C.I.T.-Compagnie Industrielle Des Telecommunication, Paris, France

Filed Jan. 19, 1970, Ser. No. 3,823
Claims priority, application France, Jan. 17, 1969, 6900829
Int. Cl. H04l 25/52
U.S. Cl. 178—70 R **7 Claims**

Apparatus for connecting telegraph channels by control from a central control member having access to respective sections to be connected, including a transmitter and a receiver connected in series between the two sections of the channel and the central control member being connected to the receiver to selectively inhibit the output thereof.

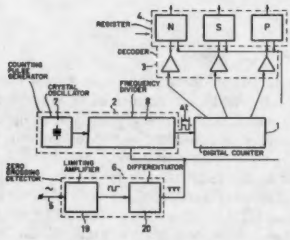


3,647,967

TELEGRAPHY RECEIVER FOR HARMONIC TELEGRAPHY

Michel Guy Pierre Stein, Bazoches sur Guyonne, France, assignor to Societe Anonyme Telecommunications Radioelectriques et Telephoniques T.R.T., Paris, France

Filed Feb. 25, 1970, Ser. No. 14,042
Claims priority, application France, Feb. 26, 1969, 6923464
Int. Cl. H04b 1/16; H03k 9/06
U.S. Cl. 178—88 **4 Claims**



A multichannel telegraphy receiver for harmonic telegraphy where for each channel different levels of an input signal are characterized by different frequencies of the carrier. The receiver comprises for each receiver channel a discriminator including a digital counter, a continuously active counting pulse generator coupled to the input of the counter and a decoder connected to the counter and having an output circuit formed by a register. The register has a separate output for each of the different levels of the input signal. A zero-crossing detector in the input circuit of the receiver channel provides reset pulses to the counter and input pulses for the register.

3,647,968

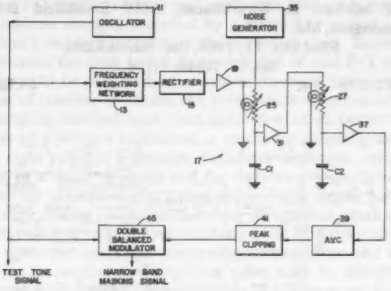
AUDIOMETER EMPLOYING NARROW-BAND NOISE MASKING

Lawrence B. Arguimbau, Lancaster, and Rufus L. Grason, Lincoln, both of Mass., assignors to Grason-Stadler Company, Inc., West Concord, Mass.

Filed Mar. 24, 1970, Ser. No. 22,356
Int. Cl. A61b 5/12
U.S. Cl. 179—1 N **13 Claims**

In the audiometer disclosed herein, a noise signal is employed for masking or preventing reception of a test tone in the ear opposite that which is being tested. The masking noise signal comprises a pair of noise sidebands centered on the test tone frequency with the test tone frequency itself

being substantially suppressed. Further, the bandwidth of the noise signal is controlled as a function of the frequency of the test tone so as to substantially correspond with the critical range of masking frequencies.

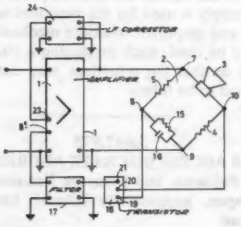


3,647,969

MOTIONAL FEEDBACK AMPLIFIER

Tadeusz Korn, 58 rue Mercelis, Brussels, Belgium

Filed Aug. 28, 1969, Ser. No. 853,665
Claims priority, application Belgium, Aug. 29, 1968, 720-115
Int. Cl. H04r *3/00*
U.S. Cl. 179—1 F **2 Claims**



A motional feedback amplifier, having an impedance bridge, one arm of which comprises a loudspeaker and which is balanced at the frequency of the loudspeaker with the diaphragm blocked, comprising a low-pass filter in the feedback loop between the reading terminals of the bridge and the input terminal for the feedback voltage to the amplifier and the characteristic of which is adjusted so as substantially to suppress the feedback voltage in the frequency zone in which the false readings appear and above that zone, a low-frequency corrector in the conventional negative feedback loop, the said filter being preceded by a transistor, two control electrodes of which, are fed with a signal from the reading terminals of the bridge and the output electrode of which delivers the motional feedback signal to the amplifier.

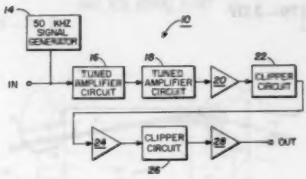
3,647,970

METHOD AND SYSTEM FOR SIMPLIFYING SPEECH WAVEFORMS

Gillis P. Flanagan, 5207 Mimosa, Bellaire, Tex.

Filed Aug. 29, 1968, Ser. No. 756,124
Int. Cl. H04k *1/00*
U.S. Cl. 179—1.5 **19 Claims**

A speech waveform is converted to a constant amplitude square wave in which the transitions between the amplitude extremes are spaced so as to carry the speech information. The system includes a pair of tuned amplifier circuits which act as high-pass filters having a 6 decibel per octave slope from 0 to 15,000 cycles followed by two stages, each comprised of an amplifier and clipper circuit, for converting the filtered waveform to a square wave. A radio transmitter and receiver having a plurality of separate channels within a conventional single side band transmitter bandwidth and a system for transmitting secure speech information are also disclosed.

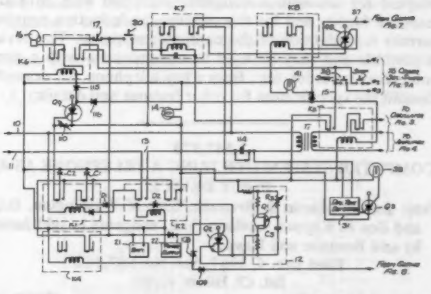


3,647,971

AUTOMATIC REPORTING MONITORING AND CONTROL SYSTEM

Edward J. Cushman, Irvington, N.Y., and Jasper Clark, East Lynn, W. Va., assignors to Watch-Tel 24, Inc., Flushing, N.Y.

Filed Mar. 20, 1970, Ser. No. 21,335
Int. Cl. H04m *11/00*
U.S. Cl. 179—2 A **14 Claims**

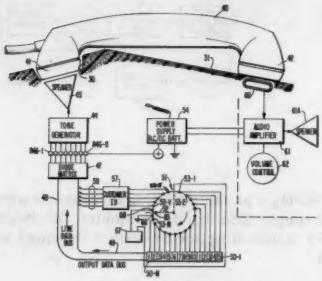


Machinery or other apparatus at a remote location is monitored and/or controlled by means of coded tone signals in the audio range transmitted between a master control station and one or more remote stations through the medium of conventional telephone lines. Both the master and the remote stations have transmitting equipment including an encoder and receiving equipment including a decoder which are operated in a sequence depending upon whether a control, monitoring or automatic reporting operation is taking place. The code employed is a four out of 16 tone system which gives 256 possible tone combinations and hence, 256 discrete pieces of information which can be conveyed between the master and control stations. For example, one such tone combination might be used to identify the remote station, while other tone combinations could be used to convey control commands from the master to a remote station and to report on the conditions of the monitored apparatus at the remote station to the master station.

3,647,972
LOW-COST PORTABLE TERMINAL DEVICE FOR ELECTRONIC DATA PROCESSING

William T. Glover, and Eugene W. Kelly, both of Atlanta, Ga., assignors to Squaires-Sanders, Inc.

Filed Aug. 16, 1968, Ser. No. 753,130
Int. Cl. H04m *11/06*
U.S. Cl. 179—2 DP 16 Claims

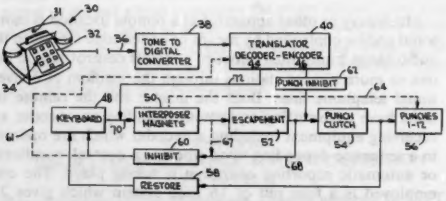


Low-cost portable terminal equipment for electronic data processing incorporating an array of manually positionable switches as a data selection and storage mechanism controlling a tone generator by way of a manually initiated scanner. Once it is manually initiated the scanner automatically interrogates the manually positioned data mechanism to control the emission of selected tones constituting code data via a transmitting audio couple over common carrier or private communication circuits to a utilization device such as a conventional computer facility, data recorder (card punch either local or remote, etc.). The terminal is particularly well adapted for use with a computer equipped with an audio response facility and for this purpose, an induction coupling permits reproduction of the computer response. The device is portable and may be used to communicate with a computer, data recorder, etc., from a pay telephone, for example. Consult the specification for other features and details.

3,647,973
COMPUTER SYSTEM UTILIZING A TELEPHONE AS AN INPUT DEVICE

Peter James; Martin J. Brennan, both of Washington, D.C., and Ben E. Kappes, Lanham, Md., assignors to said James, by said Brennan and Kappes

Filed Dec. 4, 1967, Ser. No. 687,802
Int. Cl. H04m *41/06*
U.S. Cl. 179—2 DP 34 Claims

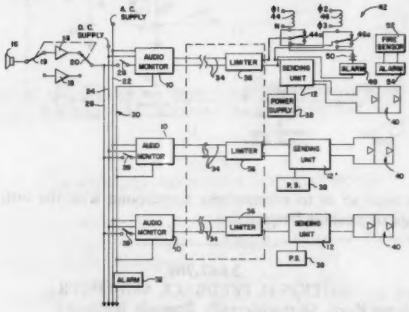


A system effecting automatic remote control of a computer or computer device through existing telephones. A telephone technique is disclosed providing a selective generation of a plurality of output signals. These output signals are decoded and then encoded by a programmed translator device in a manner so as to effect operation of any desired computer mechanism.

3,647,974
SOUND-TYPE DETECTION SYSTEM

Raymond E. Geisler, RFD 02 Araby Road, Frederick, Md.; Leroy E. Hull, 2701 Weissman Road, Silver Spring, Md., and Michael E. Kirschbaum, 4419 Brookfield Drive, Kensington, Md.

Filed Oct. 21, 1969, Ser. No. 868,086
Int. Cl. H04m *11/04*
U.S. Cl. 179—5 R 4 Claims

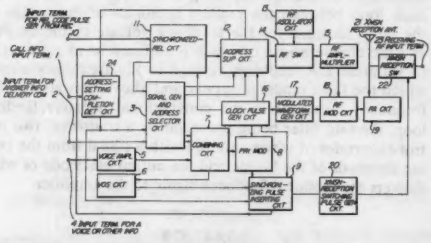


A sound-type intrusion and mechanical disturbance detection system includes a plurality of monitors located at a control station and individually connected detector-transducer units located in the various areas to be protected. A common AC and DC supply is used for the monitors as well as a common speaker and amplifier. Multiple mechanical disturbance detectors may be used, each producing a characteristic output sound so as that the attendant may determine the appropriate action to be taken.

3,647,975
RANDOM ACCESS DISCRETE ADDRESS SYSTEM

Kimio Goto, Fujisawa, and Hiroyasu Nakamura, Yokohama, both of Japan, assignors to Hitachi, Ltd., Chiyoda-ku, Tokyo, Japan

Filed Aug. 31, 1970, Ser. No. 68,105
Claims priority, application Japan, Feb. 27, 1970, 45/16205
Int. Cl. H04j *3/04*
U.S. Cl. 179—15 BA 6 Claims



A random access discrete address system comprising all or a part of: a means for generating, through call information, a call signal which connects the line for a certain period of time and also a variable address selection command which connects the line until the completion of a conversation, and for generating, through call signal receipt information, a ringback signal and an intrinsic address selection command which connects the line until the completion of a conversa-

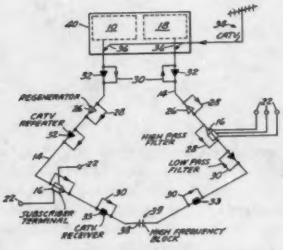
tion and further, for generating in some cases a busy signal and an intrinsic address selection command and a variable address prohibition command which connect the line only for a certain period of time; a means for switching each time slot of an F–T matrix address and reading out for each time slot an address memory recorded by a method of setting a subscriber's number including a dial or touch tone, thereby to determine the path to the frequency slot of said F–T matrix address to be switched to; a means for intercepting an RF input of receiver by means of a pulse which is continued over a sampling interval upon each generation of an output code pulse of a primary modulator; a means for detecting an output code pulse of a primary modulator each time upon the start of a voice or signal and for delivering a synchronizing pulse for a receiver of a called party; and a means for temporarily storing output code pulses of receiver, reading the code pulses through a synchronizing pulse of a transmitter at the same station as one comprising said receiver, and transferring to another synchronizing pulse train by detecting a stepout each time of the occurrence of said stepout, thereby to accomplish a synchronized relay.

3,647,976

TIME-SHARING SUBSCRIBER COMMUNICATIONS SYSTEM

Donald W. Moses, Robbinsdale, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 9, 1970, Ser. No. 17,367
Int. Cl. H04j 7/00
U.S. Cl. 179—15 AL **27 Claims**



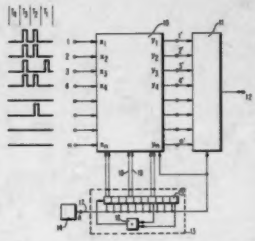
A time-sharing subscriber communications system wherein a time-division multiplexed signal having a series of frames and a predetermined number of time slots in each frame is transmitted in a given frequency band over a single wideband circuit to a plurality of subscriber terminals. Various time slots contain information from various input channels which are respectively related to various ones of the subscriber terminals. The transmitted signal is modulated by a zero axis crossing modulation scheme wherein each time slot is defined by the interval between successive zero axis crossings and the information contained in each time slot is defined by the duration of the time slot. At each subscriber terminal the information related to that channel is tapped off from the signal received from the transmitter terminal, a portion of the received signal is retransmitted over the wideband circuit and new information related to the subscriber terminal is newly transmitted in one or more time slots of each frame of the time-division multiplexed signal. A receiver terminal, interfaced to the opposite end of the wideband circuit from the transmitter terminal, demodulates the newly transmitted information from the subscriber terminal and provides output signals to various output channels respectively related to various ones of the subscriber terminals.

3,647,977

MULTIPLEXER

Felix H. Closs, Adliswil Zurich, Switzerland, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 7, 1970, Ser. No. 35,413
Claims priority, application Switzerland, May 14, 1969, 7445/69
Int. Cl. H04j 3/00
U.S. Cl. 179—15 BA **12 Claims**



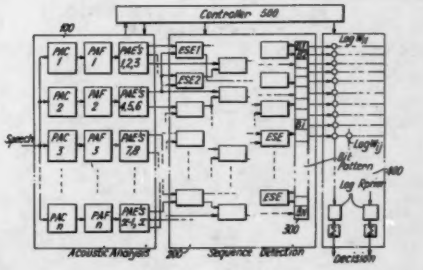
A multiplexer for use in a transmission system is provided with a priority switch with *n* inputs and *n* outputs. When a signal is present on only one of the inputs, the switch acts to connect the signal to its associated output. When a signal is present on more than one input at a given time, the priority switch acts to select for connection only one of the signals to its associated output, the selection process being achieved in a pseudorandom manner.

3,647,978

SPEECH RECOGNITION APPARATUS

David Roderic Hill, Alberta, Canada, assignor to International Standard Electric Corporation

Filed Feb. 18, 1970, Ser. No. 12,408
Claims priority, application Canada, Apr. 30, 1969, 21952/69
Int. Cl. G10l 1/02
U.S. Cl. 179—1 5A **18 Claims**

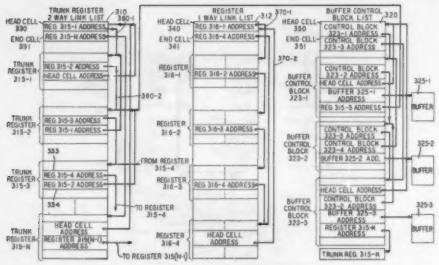


Speech recognition apparatus is provided which is responsive to selected acoustic characteristics for decomposing a signal representing an acoustic input into analogue signals on parallel channels. The analogue signals are transformed into binary signals on parallel channels which constitute time ordered event markers. The apparatus includes means for marking the occurrence of sequential events representing sequential properties of the binary signals and means for storing as a nonordered array pattern information representing both content and order information relating to the acoustic input.

3,647,979
PROGRAM STORE ERROR DETECTION ARRANGEMENTS FOR SWITCHING SYSTEMS

Harvey Rubin, New York, N.Y., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 13, 1970, Ser. No. 2,542
Int. Cl. H04q *3/54*
U.S. Cl. 179—18 ES **11 Claims**

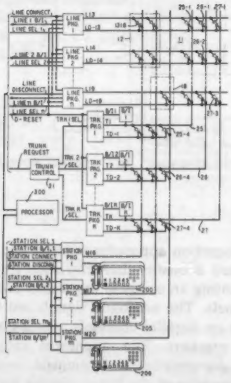


A switching system includes a common control store having a plurality of circuit control registers which registers are arranged on a plurality of linked lists. Registers on different lists are linked together to control the operation of related circuits. Upon the detection of a linked register error, the detected register is removed from the lists and the codes contained therein are altered to ignore references thereto. The detected register is placed on an isolation list for a predetermined time during which time processing and store references to the detected register are deleted from the store. After the predetermined time the codes of the detected register are then altered to correspond to an idle state.

3,647,980
SWITCHING NETWORK CONTROL WITHOUT NETWORK MAP

Lucian Philip Fabiano, Jr., Denver, Colo.; John Paul Grandmaison, Sudbury, Mass.; William Wallace Greason, III, Longmount, and Ted R. King, Jr., Broomfield, both of Colo., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 7, 1970, Ser. No. 35,434
Int. Cl. H04q *3/54*
U.S. Cl. 179—18 ES **14 Claims**

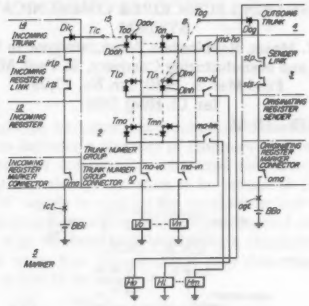


A key telephone system is disclosed in which switching functions are carried out in a central switching network instead of at the telephone set to reduce the amount of cabling in the system. The network is controlled by a central processor without requiring a network map in memory. The network contains fewer cross-points than the product of the number of stations and lines and means are provided to select a special trunk when an attempt is made to operate a nonexistent cross-point at the "intersection" of the desired station and line.

3,647,981
SWITCHING SYSTEM HAVING MEANS FOR IDENTIFYING LOCATIONS OF BOTH INCOMING AND OUTGOING TRUNK CIRCUITS

Eiroku Kondo; Hirotaka Usuda; Hidemasa Suzuki, and Tuneo Furuya, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of application Ser. No. 667,907, Sept. 15, 1967, now abandoned. This application Jan. 13, 1970, Ser. No. 2,520
Claims priority, application Japan, Sept. 17, 1966, 41/87509
Int. Cl. H04m *7/00*
U.S. Cl. 179—18 AH **3 Claims**

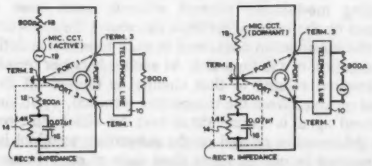


An improved circuit arrangement in a crossbar switching system, for identifying the location in switch frame of an outgoing trunk, according to which arrangement said identification of the location of an outgoing trunk is achieved by using a trunk number group and an incoming trunk, thus a number of circuit components are economized.

3,647,982
TELEPHONE ANTISIDETONE CIRCUIT

Patrick David van der Puije, Ottawa, Ontario, Canada, assignor to Northern Electric Company Limited, Quebec, Canada

Filed Aug. 13, 1970, Ser. No. 63,458
Int. Cl. H04m *1/58*
U.S. Cl. 179—81 A **3 Claims**



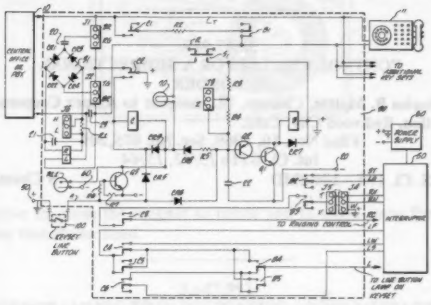
A transistorized wired circulator transfers power from microphone to telephone line (minimizing sidetone) and transfers power from telephone line to earphone, with microphone, telephone line, and earphone delta connected to the circulator.

3,647,983

KEY SYSTEM LINE CARD CIRCUIT

Alan R. Fitzsimons, Laguna Beach, and Robert J. Phelps, Anaheim, both of Calif., assignors to San/Bar Electronics Corporation, Long Beach, Calif.

Filed Aug. 25, 1969, Ser. No. 852,585
Int. Cl. H04m *1/00*
U.S. Cl. 179—99 31 Claims



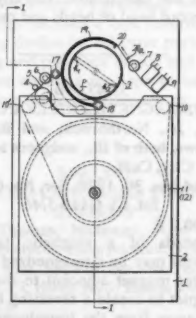
A line card circuit for a key telephone system which system includes a subscriber line comprising a pair of line conductors interconnecting a central office with a subscriber station set. The line card circuit has sensing means which are responsive to ringing signals in the line conductors to initiate local signaling indicative of the presence of an incoming call. Means are provided to assure that the sensing means is non-responsive to noise transients. Means are further provided responsive to the operation of the sensing means to maintain said local signaling for a predetermined period. Additional means are provided to rapidly switch the associated line into a "hold" condition when required which rapid switching assures that associated PBX or central office equipment will not receive a premature line release indication. Means are further provided to perform all the necessary switching and supervisory functions required by the associated line.

3,647,984

MAGNETIC RECORDING AND/OR REPRODUCING DEVICE WITH TAPE ENGAGEMENT MEANS WHICH MOVES IN A CONCENTRIC PATH WITH THE HEAD

Yoshimi Watanabe, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed July 1, 1969, Ser. No. 838,072
Claims priority, application Japan, July 4, 1968, 43/46916
Int. Cl. G11b *15/66, 23/04*
U.S. Cl. 179—100.2 Z 10 Claims



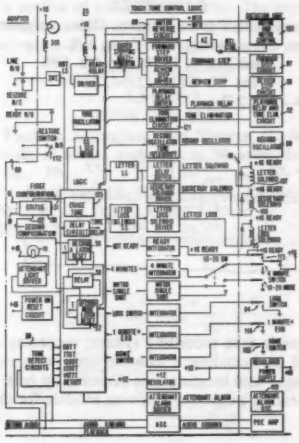
A magnetic recording and/or reproducing apparatus having a guide drum and at least one rotary magnetic head associated therewith is provided with a device for automatically drawing a magnetic tape from a cassette and wrapping the tape about the guide drum for scanning by the rotary head. Such device includes at least one tape engaging means for engaging the tape in the cassette or cartridge when the apparatus is in an inactive condition and being moved in an arcuate and substantially concentric path about at least a portion of the periphery of the guide drum for wrapping the tape on the latter.

3,647,985

TONE-ACTUATED DICTATION SYSTEMS WITH VOICE BUFFER OPTION

Matthew P. Langendorf, and Charles L. Ridings, both of Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of application Ser. No. 737,642, June 17, 1968, now Patent No. 3,549,821. This application June 22, 1970, Ser. No. 48,245
Int. Cl. G11b *21/12;* H04m *1/64*
U.S. Cl. 179—100.1DR 1 Claim



The invention concerns dictation systems having facilities for selectively connecting remote stations to a central recording unit, and recognizing control tones generated at a connected remote station to effect all operations required including recording and playback of audio (voice) signals. The systems include, in several versions, circuits responsive to presence or absence of voice signals to start and stop the recording unit (respectively), an intermediate voice buffer to prevent loss of voice signals during startup time and features circuitry to insure that control tones are recognized properly, but not recorded on the media in the central recording unit.

3,647,986

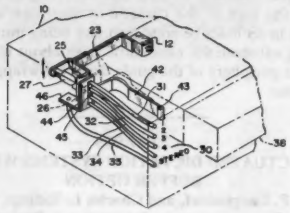
TRACK INDICATOR FOR A TAPE PLAYER

Melvin A. Lace, Prospects Hts., and Laszlo N. Repay, Chicago, both of Ill., assignors to Motorola, Inc., Franklin Park, Ill.

Filed Dec. 29, 1969, Ser. No. 888,396
Int. Cl. G11b *27/34, 21/08, 5/36*
U.S. Cl. 179—100.2MD 10 Claims

A track-indicating device for a cartridge tape player uses a single indicating lamp and a control lever which is moved to different positions with the positioning of the tape head to cause light from the lamp to be channeled to a particular one of a number of windows in an indicating panel corresponding to the track to be played at each position to which the head

may be located to illuminate only that window of the indicating panel. In addition, a second control lever controls the



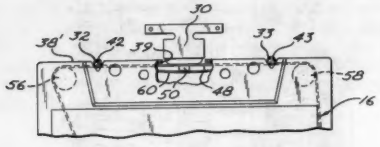
channeling of light from the lamp to a stereo indicating window when a cartridge is removed from the player.

3,647,987

CASSETTE RECORDING SYSTEM USING NOTCHED CASSETTES

James R. Trammell, Parma Heights, Ohio, assignor to Scanfax Systems Corporation, New York, N.Y.

Filed Jan. 5, 1970, Ser. No. 698
Int. Cl. G11b *15/04, 23/08*
U.S. Cl. 179—100.2 Z **1 Claim**



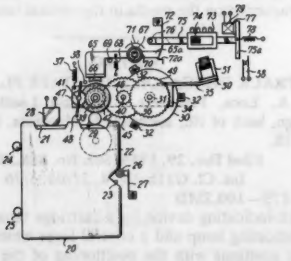
In a magnetic tape recording system, recording apparatus is described as including a cassette only with notches arranged to mate with locating pins disposed on both sides of a recording head in a cassette-receiving module for the system.

3,647,988

MAGNETIC TAPE AUTOMATIC RECORDING APPARATUS HAVING AUTOMATIC FADE-IN AND FADEOUT

Itsuki Ban, 829 Higashi-Oizumimachi, Nerima-ku, Tokyo-to, Japan

Filed Sept. 2, 1969, Ser. No. 854,679
Claims priority, application Japan, Sept. 2, 1968, 43/62338
Int. Cl. G11b *5/00, 23/04*
U.S. Cl. 179—100.2 R **8 Claims**



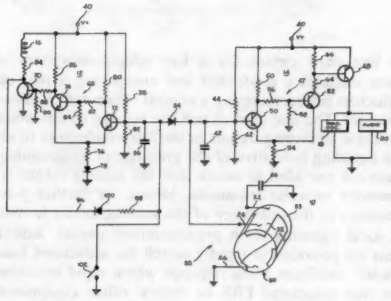
A magnetic tape automatic recording apparatus wherein a variable resistor is provided in the recording circuit for regulating the recording level, an operating shaft is rotated by a first driving device in the direction increasing the recording level in response to the initiation of the recording, rotation of the operating shaft is prevented in response to the output of a detecting circuit detecting that the recording level has reached a predetermined value, and is effected by a second driving device in the direction decreasing the recording level in response to the termination of the recording.

3,647,989

CONTROL CIRCUIT FOR A BIDIRECTIONAL RECORDER

Charles B. Mattas, Chicago, Ill., assignor to Ampex Corporation, Redwood City, Calif.

Filed Nov. 10, 1969, Ser. No. 875,209
Int. Cl. G11b *15/12, 15/44*
U.S. Cl. 179—100.2MD **5 Claims**



The control circuit includes means for sensing the motion of a tape in a bidirectional recorder. When the tape motion decreases below a predetermined minimum, the motion sensing means causes two switching circuits to change states, the first of which activates a solenoid which reverses tape motion or begins the ejection cycle, depending on the recorder operating mode. The second switching circuit deactivates a recording bias circuit and an audio circuit of the tape recorder. The first switching circuit is provided with a delay with respect to the second switching circuit so as to delay the activation of the solenoid until the bias circuit and the audio circuit are deactivated, thereby preventing magnetization of a record head or heads and muting the audio.

3,647,990

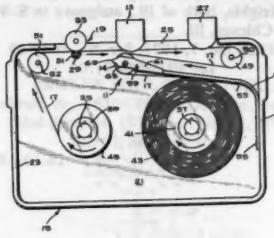
DEMAGNETIZER/CLEANER

Edward A. Eul, Jr., Northbrook, and Ronald B. Richter, Rolling Meadows, both of Ill., assignors to Ampex Corporation, Redwood City, Calif.

Filed Jan. 30, 1970, Ser. No. 6,984
Int. Cl. G11b *5/46*
U.S. Cl. 179—100.2 Z **13 Claims**

Transducer heads of a magnetic tape recording or playback apparatus may be demagnetized by placing a multipolar, permanent magnet adjacent to the transducer head, rotating the magnet to create a reversing flux field and moving the magnet away from the transducer head to diminish gradually the intensity of the field. A simultaneous demagnetizing and cleaning of the transducer head in a cartridge-receiving or cassette-receiving playback or recording ap-

paratus is achieved by having both the magnet and a cleaning tape mounted in a cartridge or cassette and by using the tape



drive to cause the magnet to rotate and to move away from the transducer head.

3,647,991

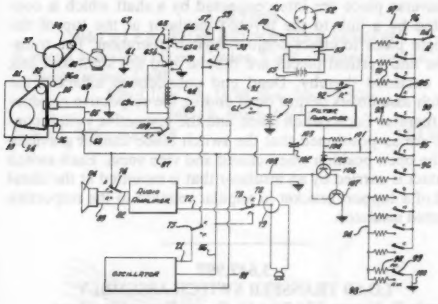
PROGRAMMED TIME-RESPONSIVE AUDIO MESSAGE AND REMINDER DEVICE

Bernard Gaon, Santa Ana; Stuart Goldfarb, and Adrienne R. Goldfarb, both of Los Angeles, all of Calif., assignors to said Stuart J. Goldfarb, by said Gaon

Filed June 23, 1969, Ser. No. 835,561

Int. Cl. G11b *15/06*

U.S. Cl. 179—100.2 S **5 Claims**



A time-responsive audio programmed message and/or reminder device which includes a tape recording and playback apparatus, a timing device for selective periodic operation of the tape recording and playback device and a recording time selection apparatus enabling the tape to be selectively programmed to deliver an audio message at a predetermined time.

3,647,992

ADAPTIVE ECHO CANCELLER FOR NONLINEAR SYSTEMS

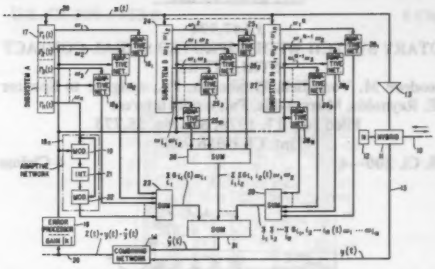
Edmond Joseph Thomas, Matawan, N.J., assignor to Bell Telephone Laboratories Incorporated, Murray Hill, N.J.

Filed Mar. 5, 1970, Ser. No. 16,745

Int. Cl. H04b *3/20*; **H04m** *9/08*

U.S. Cl. 179—170.2 **12 Claims**

Operation of a closed-loop echo cancellation system for use in a two-way communication circuit is improved by employing a multidimensional network capable of approximating a large class of nonlinear transfer functions, and a control circuit arrangement for automatically adjusting parameters of the network. Signals incoming to a four-wire to two-wire junction are supplied to the network which, supplied with an



error signal derived from signals in the outgoing path, develops a replica of an undesired echo. The replica signal is subtracted from outgoing signals and the differential is used for the derivation of a new error signal.

3,647,993

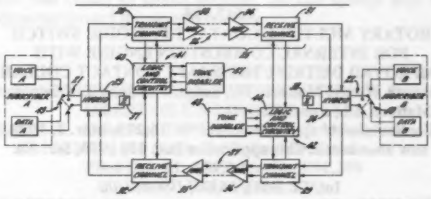
TONE DISABLER

John D. Foulkes, Lexington, and Warren G. Bender, Wellesley, both of Mass., assignors to Wescom, Inc., Downers Grove, Ill.

Filed May 18, 1970, Ser. No. 38,446

Int. Cl. H04b *3/20*

U.S. Cl. 179—170.2 **12 Claims**



For use in a long-distance telephone link alternately employed for voice communications and data transmission, a tone disabler for inhibiting an associated echo suppressor in response to a tone signal, such as is transmitted under existing practices prior to the transmission of data to insure that all echo suppressor controlled attenuation is removed from the telephone link during data transmission. Series and parallel resonant filters tuned to the tone frequency and a comparator circuit are used to compare the level of the tone frequency energy in the tone disabler's input signals against the level of all other voice frequency or so-called guard band energy, so that a tone signal confirming timing sequence is initiated only when the tone signal energy predominates. Once a tone signal is confirmed, the inputs to the comparator circuit are switched from the filters to a broad band load impedance, so that the tone disabler is transferred from a tone detecting to a holding mode in which the comparator circuit and a simple RC delay circuit maintain the associated echo suppressor in an inhibited condition throughout the data transmission and for a predetermined time after the tone disabler's input signal level drops below a predetermined threshold characteristic of the completion of the data transmission. Solid state switching devices are used for inhibiting

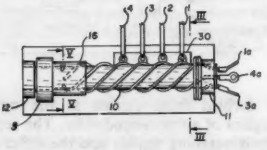
and releasing the associated echo suppressor and for transferring the tone disabler between its tone detecting and holding modes to eliminate switching transients and other potential sources of noise such as might interfere with or degrade the performance of the tone disabler, associated echo suppressor, or other equipment located nearby.

3,647,994

ROTARY SWITCH WITH IMPROVED SPIRAL CONTACT STRUCTURE

Theodore M. Vozenilek, Pittsburgh, Pa., assignor to Spencer E. Reynolds, Murrysville, Pa., a part interest

Filed July 17, 1970, Ser. No. 55,775
Int. Cl. H01h 9/00
U.S. Cl. 200—4 4 Claims



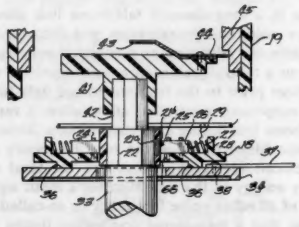
This invention relates to a rotary switch having multiple positions and multiple poles for preselecting a sequence of operations for the multiple poles with a set input sequence based on the rotary selector position. The switch embodies a plurality of spirally wound switch elements mounted on a rotary selector for the various switch position inputs with the pole contacts being stationary and in line. By such unique multiple spiral contacts, no internal switch wiring is required and the construction is made extremely simple and the cost is greatly reduced.

3,647,995

ROTARY MULTIPLE CONTACT PERIODIC SWITCH FOR INTERNAL COMBUSTION ENGINE WITH IMPROVED DISTRIBUTOR SHAFT CONTACT COLLAR

Kenneth Wisely, Mattoon, Ill., assignor to John J. Yelvington, Mattoon, Ill., a part interest

Continuation of application Ser. No. 16,273, Mar. 4, 1970, now abandoned. This application Dec. 10, 1970, Ser. No. 96,982
Int. Cl. H01h 39/00, 19/00, 1/00
U.S. Cl. 200—24 12 Claims



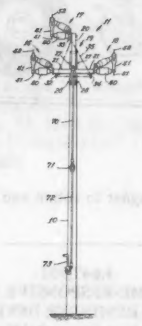
An ignition system for an internal combustion engine has circularly arranged stationary brushes and one or more insulated contacts rotating with the distributor shaft which replace the make-and-break contacts of an ordinary engine ignition system. The brushes and rotating contacts are adaptable to be mounted in the ordinary distributor housing. A single contact on the distributor shaft provides one ignition spark in each power stroke of a piston and more than one contact provides a corresponding number of sparks in each power stroke.

3,647,996

POLYPHASE DISCONNECTING SWITCH FOR HIGH-VOLTAGE CIRCUIT HAVING A CONDUCTOR AT EACH APEX OF A TRIANGLE

Joseph Bernatt, Arlington Heights, and John T. Gutmann, Prospect Heights, both of Ill., assignors to S & C Electric Company, Chicago, Ill.

Filed Jan. 7, 1971, Ser. No. 104,549
Int. Cl. H01h 31/00
U.S. Cl. 200—48 16 Claims



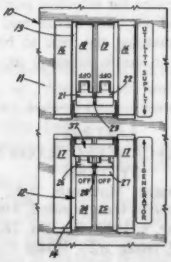
Disconnecting switch assemblies are located in a triangular configuration on an inverted cross-shaped frame adapted to be secured to the top of a power line pole. Each switch assembly includes a pivotally mounted insulator carrying a switch blade for engaging a stationary contact carried by a stationary insulator. The pivoted insulators at the ends of the transverse piece are interconnected by a shaft which is connected by a link to the pivoted insulator at the top of the upright piece to effect conjoint switch operation. The transverse and vertical pieces are tubular and the shaft and link are enclosed thereby. Dead end connections adjacent the switch assemblies permit dead ending the respective conductor thereto. Each switch blade and the respective switch contact are so positioned that the switch blade cannot gravitate to the open position when closed and vice versa. Each switch contact is carried by an insulator that is mounted at the distal end of a support bracket in angular relation to the respective pivoted insulator.

3,647,997

LOAD TRANSFER SWITCH ASSEMBLY

Marvin E. Nerem, 136 East M. Street, Forest City, Iowa

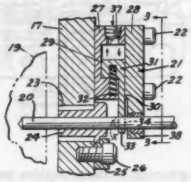
Filed Nov. 16, 1970, Ser. No. 89,957
Int. Cl. H01h 9/24
U.S. Cl. 200—50 C 9 Claims



An electric circuit load center for recreational vehicles equipped with a load transfer switch assembly operable to

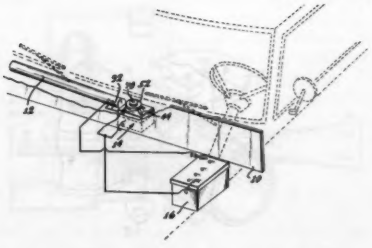
connect a utility power supply to a load and separately operable to connect a generator power supply to the load. The load transfer switch assembly has a control member operable in response to movement of separate switch handles to insure that only one power supply is connected to the load at any one time.

3,647,998
BROKEN TOOL DETECTOR
Harry E. Rohraff, Sr., 16104 Pierson Avenue, Detroit, Mich.
Filed Sept. 14, 1970, Ser. No. 71,757
Int. Cl. H01h *35/02*
U.S. Cl. 200—61.42 **20 Claims**



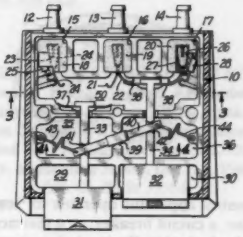
Accessory apparatus for a machine tool, to detect breakage of a tool bit and stop the machine, consists of a combined valve body, valve-actuating feeler and antideflection member mounted on the bushing plate of the machine, and a pneumatic system responsive to actuation of the valve by the feeler for stopping the machine and for resetting the feeler.

3,647,999
DECELERATION-RESPONSIVE SENSORS
Bernard Mazelsky, West Covina, Calif., assignor to Ara, Inc., West Covina, Calif.
Filed July 23, 1970, Ser. No. 57,525
Int. Cl. H01h *35/14*
U.S. Cl. 200—61.45 R **14 Claims**



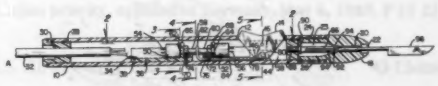
The invention is a deceleration-responsive sensor particularly adaptable for use with vehicle safety devices of the type comprising an inflatable air bag which inflates at the moment of impact to protect passengers. The sensor comprises a movable inertia mass responsive to deceleration forces acting over a wide range of direction. The inertia mass is biased to an initial position to avoid undesired continued small motion activation. The inertia mass and its mounting is constructed to have a natural frequency such that an activating deceleration force of predetermined magnitude and duration is required for the device to respond and trigger the safety mechanism.

3,648,000
COAXIAL SWITCH
John R. Thompson, 7355 Fulton Avenue, North Hollywood, Calif., assignor to Electronic Industrial Engineering, Inc., North Hollywood, Calif.
Filed Aug. 26, 1970, Ser. No. 66,994
Int. Cl. H01p *1/10*
U.S. Cl. 200—153 S **8 Claims**



A switch adapted for as an A–B coaxial cable switch for CATV systems. The switch includes a pair of depressible pushbuttons, one for each cable. The buttons always move oppositely to each other. The crossbar extends diagonally within the switch and pivots at its center on a stationary slot in the switch housing. The ends of the crossbar pivot on slots in longitudinally reciprocable bars connected to the pushbuttons. A pair of coil springs are connected between the ends of the crossbar and the housing. Movable contact members carried by the bars make or break brushing contact with stationary spring contacts each time the pushbuttons are switched. When either button is depressed to move the crossbar past center or lateral position, the coil springs urge the crossbar toward the reverse position.

3,648,001
COMPACT HAND HELD SWITCHING DEVICE WITH INSERTABLE SWITCHING MEANS
Robert K. Anderson, 295 Kiowa Place, Boulder, Colo., and Karl D. Mills, 850 Circle Drive, Boulder, Colo.
Filed Dec. 11, 1969, Ser. No. 884,289
Int. Cl. H01h *9/06, 23/28*
U.S. Cl. 200—157 **5 Claims**



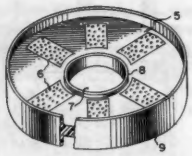
A surgical tool of the type in which cutting or cauterizing current is selectively introduced to a blade by means of a finger-operated switch actuating member, the tool comprised of an outer case and a correspondingly structured removable insert carrying the switching mechanism, the switch actuating arm between the switch actuating member and the switch mounted to reciprocate in a plane normal to the axis about which the switch actuating member oscillates to provide a compact pencil-type device, the combination case and insert being adaptable to provide switching means for applications other than surgical tools. The switches have threaded extensions which are inserted through trunnions in the casing and held there by clamping units.

3,648,002

CURRENT CONTROL APPARATUS AND METHODS OF MANUFACTURE

Gideon A. Du Rocher, Mount Clemens, Mich., assignor to Essex International, Inc., Fort Wayne, Ind.

Filed May 4, 1970, Ser. No. 34,320
Int. Cl. H01h 3/00
U.S. Cl. 200—166 C 31 Claims



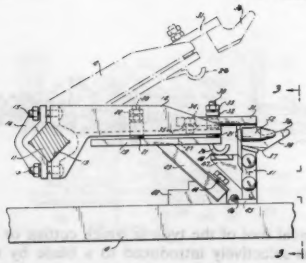
Current control apparatus operable to function selectively as a conductor, a circuit breaker, or a thermostat comprises a body formed of electrically insulating, compressible, inorganic, preferably elastomeric material having one or more portions thereof provided with discrete, electrically conductive particles which move relatively to one another into and out of engagement in response to changes in the state of compression to which the body is subjected or in response to variations in temperature of the body. The conductive portion or portions of the body extend through the latter from one side to the other, but are electrically isolated from one another by the nonconductive body portions. The body may include upstanding ribs or flanges on either or both of its opposite surfaces for the purpose of providing seals to prevent the entry of moisture or other foreign matter to the area bounded by the flanges.

3,648,003

ELECTRICAL SWITCH HAVING CONTACTS PROVIDED WITH ROLLERS

Dominik M. Wiktor, Cranford, N.J., assignor to Automatic Switch Company

Filed Jan. 29, 1971, Ser. No. 111,064
Int. Cl. H01h 1/16
U.S. Cl. 200—166 BB 7 Claims



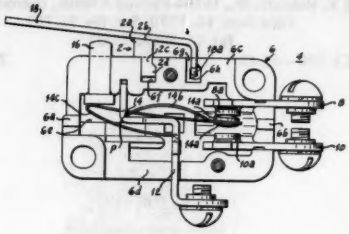
A knife-type electrical switch including a blade contact and a pair of roller contacts between which the blade contact moves when the switch closes. The rollers are rotatable about axes substantially perpendicular to the direction of blade movement between them. The rollers have tapered ends, and the blade edge facing the rollers diverges from the rollers. Each roller is carried by an arm mounted to pivot about a point spaced from the rollers, and spring means constantly urge the arms and hence the rollers toward each other.

3,648,004

AUXILIARY SUPPORT MEANS FOR ELECTRICAL SWITCH ACTUATOR

Robert C. Williams, III, Smithfield, N.C., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Feb. 25, 1971, Ser. No. 118,819
Int. Cl. H01h 3/04, 1/50
U.S. Cl. 200—166 H 2 Claims



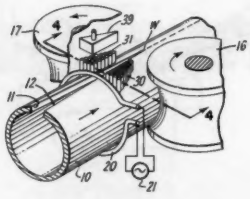
A miniature precision snap action switch having a one-piece stressed blade contactor biased to a first position and operable to a second position by depression of an operator plunger, is provided with a lever actuator pivotally mounted in one of two recesses provided therefore in the housing to extend across the unused recess and the plunger to normally rest on the plunger. A resilient pad is positioned on the housing between the plunger and the pivoted end of the lever to support the lever in a position raised off the plunger whereby the pad must be initially compressed before the lever may engage the plunger. The pad is retained on the housing by a portion depending into the unused recess and shaped for retentive engagement therewith.

3,648,005

INDUCTION TUBE WELDING WITH IMPROVED CURRENT PATH

Wallace C. Rudd, Larchmont, N.Y., assignor to AMF Incorporated

Filed Aug. 28, 1970, Ser. No. 67,841
Int. Cl. H05b 5/00
U.S. Cl. 219—8.5 7 Claims



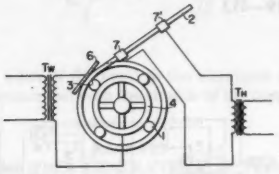
Welding current path is restricted to immediate regions of edges of open tube by use of bodies of magnetic material placed on respective sides of V-shaped gap in region between weld point and induction coil. Each body has an edge closely adjacent, but spaced from, edge of tube, and a second edge closely adjacent induction coil. Magnetic bodies are fabricated from short rods of ferrite material secured together in bundles in a manner to leave a plurality of substantially uniformly distributed void spaces extending through the bodies in direction transverse to tube. Fluid coolant is passed through void spaces to keep temperature of ferrite material below its Curie temperature. Magnetic bodies could be molded as unitary blocks with cooling passages molded therein.

3,648,006

METHOD OF PRESERVING MECHANICAL PROPERTIES OF STEEL WIRE DURING SPOT WELDING

Tatuo Amakasu, Tokyo, and Takao Yamazaki, Fujisawa, both of Japan, assignors to Koushuha-Netsuren Kabushiki Kaisha, Tokyo, Japan

Original application Dec. 4, 1968, Ser. No. 781,174, now Patent No. 3,573,418. Divided and this application Aug. 3, 1970, Ser. No. 60,686
Int. Cl. B23k *11/00*
U.S. Cl. 219—58 1 Claim



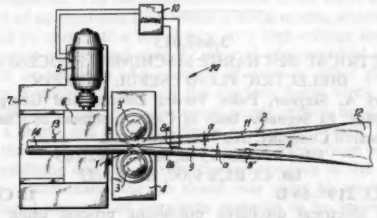
A method for preserving the mechanical properties of steel wire or rod during spot welding of such steel wire or rod to form cages for use in prestressed concrete. The hoop reinforcing wire is, during the winding operation, preheated between a pair of feeders by direct passage of current therethrough to a temperature of from 300°–1000° C. Thereafter the thus heated wire is successively welded to reinforcing rods.

3,648,007

DEVICE FOR THE CONTINUOUS LONGITUDINAL SEAM WELDING OF TUBES

Willi Oppermann, Duisburg; Egon Schonitz, Rheinhausen, and Werner Wagner, Homberg, all of Germany, assignors to DEMAG Aktiengesellschaft, Duisburg, Germany

Filed May 7, 1970, Ser. No. 35,386
Claims priority, application Germany, May 7, 1969, P 19 23 241.8; Mar. 13, 1870, P 20 11 927.1
Int. Cl. B23k *31/06*
U.S. Cl. 219—59 7 Claims



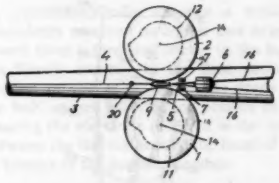
A device for the continuous longitudinal seam welding of tubes particularly by electron beam welding, includes a pair of opposed rollers arranged with their mating groove portions in opposition on a bracket which may be rotated so as to shift the rollers in transverse directions. The arrangement includes means for scanning the strip edges of a sheet material which is fed and formed into the form of a slotted tube and adjusting the edges so that the tube is fed between the rollers with the longitudinal groove or slot centered therebetween. The scanning elements are arranged along the strip edges to be welded and actuate a control for a motor which is employed for shifting the grooved rollers with the tube in order to control the position of the weld seam for the purpose of centering the seam in respect to the electron beam. In a preferred arrangement the workpiece is guided by pressure rolls arranged on respective opposite sides of the workpiece which are advantageously carried on a rocker arm so that they may be jointly pivoted about the axis of the workpiece. A second pressure roll pair for guiding the workpiece is advantageously arranged on the rocker arm at a location between the contactless scanning device and the welding pressure roll pair. The second pressure roll pair forces the two band edges of the sheet to be formed firmly together and firmly grips the workpiece running therebetween in the same manner as the welding pressure roll pair.

3,648,008

METHOD OF MAKING TAPERED POLES

Tomoyoshi Kawato, Tokyo; Takashi Kusakabe, Yokohama-shi, and Toshiyuki Ono, Tokyo, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 9, 1969, Ser. No. 883,508
Claims priority, application Japan, Dec. 11, 1968, 43/90194
Int. Cl. B23k *31/06*
U.S. Cl. 219—67 18 Claims



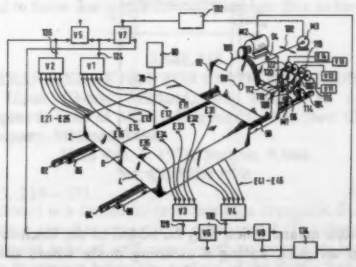
The present invention relates a method of making tapered poles or tapered tubes, e.g., illuminating poles, or tapered tubes having diminishing cross sections for various kind of structural materials. A preformed tapered tube is inserted between miniaturized forming rollers having cam faces with a circumference of $1/n$ of the length of a tapered tube to be made, where n is between 2 and 10, and as said tube is drawn at the speed as high as n times the peripheral speed of the forming rollers the welding is performed on a longitudinal aligned edges of the tube so as to make desired products by means of the comparatively small high-frequency welding apparatus.

3,648,009

METHOD AND DEVICE FOR INSPECTING AND/OR CONTROLLING THERMALLY PRODUCED MECHANICAL JOINTS

Karl Heinz Steigerwald, 55 Haderunstr. 1a, Munich, Germany

Filed May 5, 1970, Ser. No. 34,775
Claims priority, application Germany, May 6, 1969, P 19 23 132.4
Int. Cl. B23k *9/00*
U.S. Cl. 219—121 EM 43 Claims



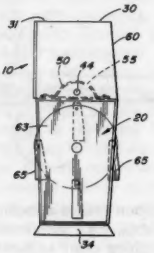
The invention is concerned with a method and apparatus for effecting a thermal joint between two materials while

sensing the condition of the joint during the joining process. The described example utilizes an electron beam as the heating means, there being sensing elements located in the region of the joint being made. The elements are sensitive to temperature or sonic or electric signals, and their outputs are processed to show the state of the joint, or to control the means making the joint. The sensing elements may be fixed to the workpieces or move with the electron beam along the path of the joint.

3,648,010
COMBINATION OVEN AND ILLUMINATED DISPLAY ASSEMBLY

Jacques Schier, Deerfield, Ill., assignor to Martin-Brower Corporation, Chicago, Ill.

Continuation-in-part of application Ser. No. 881,659, Dec. 3, 1969, now Patent No. 3,586,823. This application Mar. 5, 1971, Ser. No. 121,488
Int. Cl. H05b *1/00*
U.S. Cl. 219—214 **9 Claims**

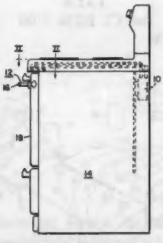


A combination oven and illuminated graphic display apparatus using a single radiant energy source for both heating and lighting purposes in which items are placed on trays carried by a removable, motor driven rotary assembly. The graphic display contains decorative or advertising material promoting the sale of items held by the rotary assembly.

3,648,011
OVEN LATCH OPERATED FEATURE SWITCH

Calvin J. Holtkamp, Mansfield, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 9, 1970, Ser. No. 45,097
Int. Cl. F27d *11/02*
U.S. Cl. 219—413 **6 Claims**

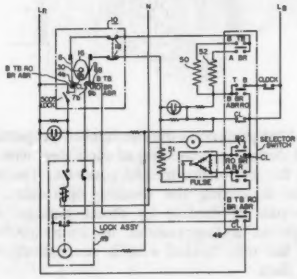


A switch means which may be added to the latch arrangement of an oven having a cleaning mode where the oven latch is moved to an engaged and locked position in such a mode. The switch means is physically actuated by this movement and can be utilized, advantageously, either as an engagement or a disengagement means for some portion of the oven control system thereby eliminating the use of a selector switch requiring several additional terminals and the resulting cost of an additional terminal selector switch.

3,648,012
OVEN CONTROL SYSTEM INCLUDING SINGLE-DIAL CONTROL

Calvin J. Holtkamp, Mansfield, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 31, 1970, Ser. No. 103,098
Int. Cl. F27d *11/02*
U.S. Cl. 219—413 **7 Claims**



A single-dial oven control is provided for a heat-cleaning oven in which rotation of the dial throughout the greater portion of its rotatable range covers the normal cooking temperature range, with rotation to a point in the remaining part of the rotatable range setting the control for a heat-cleaning operation in the oven. The control includes switch means connected directly in series with the electrical heating means in the oven and incorporates an arrangement for converting linear rotational motion of the user-operated shaft into nonlinear axial motion of means for changing the temperature setting.

3,648,013
ELECTRICAL DISCHARGE MACHINING PROCESS AND DIELECTRIC FLUID USEFUL THEREIN

Robert A. Stayner, Palos Verdes Estates, and George B. DeMay, El Segundo, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Nov. 23, 1970, Ser. No. 92,183
Int. Cl. B23k *9/00*; H01b *3/22*
U.S. Cl. 219—69 D **18 Claims**

An electrical discharge machining process using as a dielectric fluid a composition comprising a base oil and a minor amount of a conductivity additive containing a chromium salt of an alkyl salicylic acid and an alkaline earth metal salt of a dialkyl sulfosuccinate.

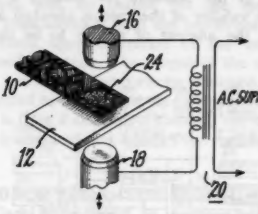
3,648,014
METHOD OF JOINING COPPER BRAID TO ALUMINUM AND THE JOINT FORMED THEREBY

Moreland P. Bennett, Pittsfield, Mass., assignor to General Electric Company

Filed July 15, 1969, Ser. No. 841,947
Int. Cl. B23k *9/00, 11/16*
U.S. Cl. 219—118 **2 Claims**

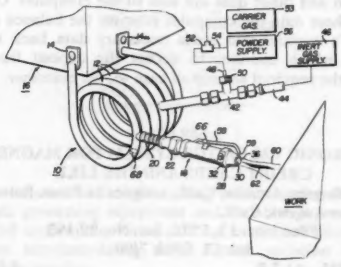
A copper braid is joined to an aluminum member by first tin-plating the copper braid and then clamping the copper

braid and the aluminum member between resistance-welding electrodes. Heat and pressure are then applied to bond the



small copper wires of the braid to the aluminum and to extrude the aluminum between the strands of the copper braid.

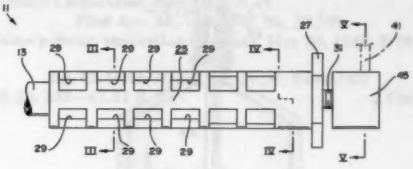
3,648,015
RADIO FREQUENCY GENERATED ELECTRON BEAM TORCH
Thomas E. Fairbairn, The Belvedere Bldg., Galion, Ohio
Filed July 20, 1970, Ser. No. 56,411
Int. Cl. B23k *9/00*
U.S. Cl. 219—121 P **4 Claims**



An electron beam torch whose flame is generated by high-power radio frequency provided by a modified radio frequency transmitter. The mechanical structure of the torch is comprised of an electrode held within a metal nozzle, which is attached by means of a metal tube to a high-voltage low-current point of the final output tank coil of a modified output circuit or amplifier. An amount of inert or other gaseous media is utilized to enclose the electron beam torch flame immediately adjacent to the torch nozzle orifice, to (1) provide a shield and focus the flame on the workpiece, (2) to cool the torch nozzle and prevent the electrode from melting and oxidizing and (3) to vary the temperature of the workpiece. Additionally, the gas shield may carry an amount of powdered ceramic or aggregate material to be introduced around the electron beam torch flame for flame spray coating of articles. The inert gas, or similar gaseous media together with the powdered ceramic or aggregate material are introduced into the final output tank coil of the modified high-frequency output circuit at a high-current low-voltage point to prevent ionization heating of the torch nozzle and carrier supply tubes.

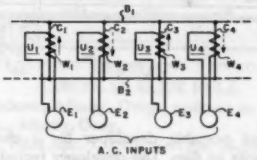
3,648,016
ARC WELDING ELECTRODE HOLDER
Charles G. Matthews, 1647 Semmes St., Memphis, Tenn.
Filed Mar. 24, 1971, Ser. No. 127,679
Int. Cl. B23k *9/28*
U.S. Cl. 219—142 **3 Claims**

An arc welding electrode holder having a conductive base member which is covered by an insulating material defining a handle. The distal end of the handle includes a disklike splatter shield for protecting the hand of the user and reducing muscle fatigue while grippingly supporting the holder and the heavy electrical cable attached thereto. The electrode is clampingly held by one end thereof extending inwardly through a transverse aperture in an amazingly durable insulated cuplike member defining the outermost end of the holder. The open end of the cuplike member, being directed



rearwardly, circumferentially engages a nutlike member which is threadedly received on a bolt that extends longitudinally forward from a threaded socket in the base member. The bolt is fixedly secured to the base member so that manual rotation of the cuplike member tends to seat the head of the bolt against the interior bottom of the cuplike member, causing the electrode received in the aperture to be clamped between the flat surfaces of the head of the bolt and the interior bottom of the cuplike member.

3,648,017
DEVICE FOR DEICING RAILS
Yoshiyuki Obata, Kobe, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed May 28, 1970, Ser. No. 41,330
Claims priority, application Japan, June 6, 1969, 44/44468
Int. Cl. H05b *5/08*
U.S. Cl. 219—213 **15 Claims**

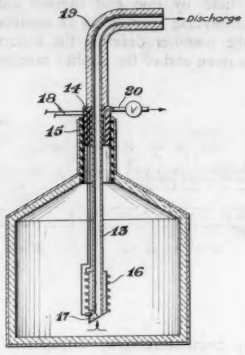


Two parallel rails of a track are magnetically interconnected to cause an alternating current magnetic flux to flow through them. The rails are self-heated with the iron loss caused in them due to the flow of magnetic flux to be deiced.

3,648,018
TRANSFER DEVICE FOR CRYOGENIC FLUIDS
Chin Huan Cheng, Midland, and Donald E. Leonard, Shepherd, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.
Filed Feb. 5, 1970, Ser. No. 9,004
Int. Cl. F22b *1/28*
U.S. Cl. 219—271 **4 Claims**

Disclosed is a device for transferring a cryogenic fluid from its storage vessel to cryostat or other vessel. The device is an open ended tube of sufficient length to permit its lower extremity to project below the surface of the fluid when it is inserted into an opening in the vessel. The tube is fitted with a collar which forms a substantially airtight seal between the tube and the opening. A heater capable of producing suffi-

cient heat to vaporize part of the fluid is attached to the tube. The vaporization creates an internal pressure which forces the fluid up through the tube. By insulating the heater from



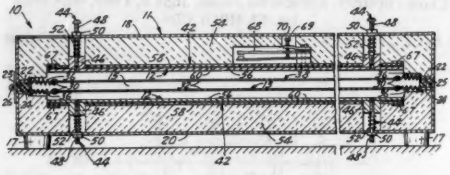
the tube so that the fluid forced into the tube is not vaporized, a steady flow of cryogenic fluid is delivered to a desired location, e.g., a cryostat.

3,648,019

DEVELOPER

Frederick G. Brewitz, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 4, 1971, Ser. No. 103,654
Int. Cl. F24c 7/10
U.S. Cl. 219—386 **6 Claims**



A simple and portable developer for a sheet of heat developable paper or film. The developer includes a pair of heaters mounted in parallel opposed relationship to define a heated zone and to provide a generally uniform temperature gradient within the heated zone. A support member is mounted for supporting a sheet at an essentially constant temperature level within the heated zone to develop the sheet in a predetermined time. Two halves of the developer are separable to afford insertion and removal of the sheet.

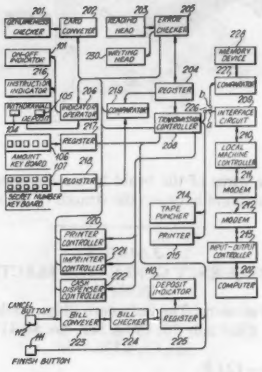
3,648,020

AUTOMATIC DEPOSIT-RECEIVING AND CASH-DISPENSING SYSTEM

Kazuma Tateisi; Yukio Mizuta, and Shizuya Ano, all of Kyoto, Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Apr. 15, 1970, Ser. No. 28,635
Claims priority, application Japan, Apr. 26, 1969, 44/32572
Int. Cl. G06k 7/01
U.S. Cl. 235—61.7 B **4 Claims**

An automatic deposit-receiving and cash-dispensing system for use in banks and the like, which contemplates the use of a customer's identification card issued by the bank to each of its customers, and comprises an automatic deposit-receiving and cash-dispensing machine, a data-transmitting system and an electronic computer which stores data concerning the balances of the accounts of the customers. When a customer uses his card in the machine for making a deposit or withdrawal, the validity of the card is checked and the account number, the amount of money to be deposited or



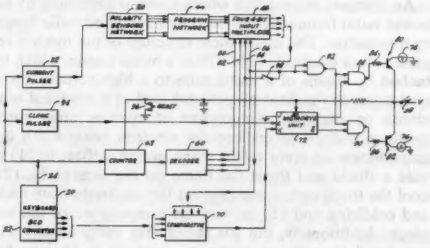
withdrawn and other data are sent to the computer. On the basis of these data the computer rewrites the balance of the customer's account and sends necessary data back to the machine, which operates to accept the deposit from, or dispense the required amount of cash to, the customer.

3,648,021

ELECTRONIC VALIDATOR SYSTEM FOR MAGNETIC CREDIT CARDS AND THE LIKE

Waldo I. Rogers, Arcadia, Calif., assignor to Rusco Industries, Inc., Los Angeles, Calif.

Filed Mar. 17, 1970, Ser. No. 20,193
Int. Cl. G06k 7/00
U.S. Cl. 235—61.7 B **5 Claims**



A plurality of resistive elements, each adapted to exhibit the Hall effect, are arranged in a plane. A magnetic card with a plurality of portions magnetized along lines perpendicular to the card faces is adapted to be placed adjacent such plane with each magnetized portion aligned with a respective element. From each element a voltage is developed which represents the polarity of the adjacent end of the magnetized card portion aligned therewith, and via a program network such voltages are applied to a multiplexer. A keyboard is provided with keys or pushbuttons to be operated by a customer in a predetermined sequence. Via a counter and decoder, successive key operations enable different portions of the multiplexer to provide successive BCD outputs therefrom, and simultaneously a converter establishes a BCD output corresponding to the number or location of each key that is

operated. The pairs of BCD signals are applied to a comparator which is connected to a memory unit. A clock pulse established upon each key operation is also applied to the memory unit, and an output for the memory unit is established coincidentally with the occurrence of the clock pulse generated upon operation of the last key in the predetermined sequence. The output of the memory unit is true if the successive comparisons matched, whereupon a lamp is operated to signify that the card is good. The memory unit output is false if all comparisons did not match, whereupon a lamp is operated that signifies the card is bad.

3,648,022

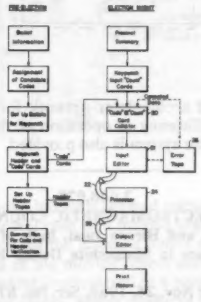
METHOD FOR TABULATING ELECTION RETURNS

Arnold G. Cook, River Forest, Ill., assignor to Automatic Voting Machine Corporation, Jamestown, N.Y.

Continuation of application Ser. No. 509,911, Nov. 26, 1965, now abandoned. This application Oct. 20, 1969, Ser. No. 867,963

Int. Cl. B41j *5/36;* **G06k** *1/12, 3/00;* **G07c** *13/00*

U.S. Cl. 235—61.9 R **12 Claims**



A novel election ballot counting method and system utilizing data processing equipment and capable of providing an itemized total of the votes cast for each vote choice in an election accommodating ballot format variation including candidate rotation.

3,648,023

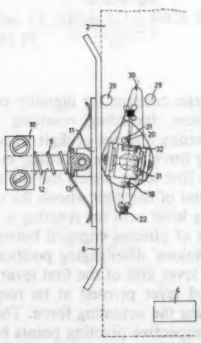
READING AND/OR WRITING DEVICE FOR RECORD CARRIERS IN CARD FORM

Horst Werner Bach, Kirburg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 25, 1970, Ser. No. 13,898

Int. Cl. G06k *9/04*

U.S. Cl. 235—61.11 D **4 Claims**



A card reader for magnetic and punched cards wherein after insertion of a card into a funnel a fence, rotatably journaled on a shaft and having a card reading head mounted thereon is pressed against the edge of the card. The reading head is therefore aligned with the card regardless of the cards alignment with respect to the funnel.

3,648,024

SENSING DEVICE

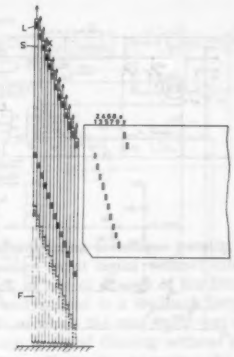
Jurgen Schroder, Hamburg; Onno Wichmann, and Werner Zuchner, both of Bremen, all of Germany, assignors to U. S. Philips Corporation, New York, N.Y.

Filed Apr. 28, 1970, Ser. No. 32,559

Claims priority, application Germany, May 20, 1969, P 19 25 488.7

Int. Cl. G06k *7/14, 1/20, 19/08;* **B44b** *5/02*

U.S. Cl. 235—61.11 E **2 Claims**



A memory device for simulating the perforations of a punched card using a group of elongated parallel plates each having at least one perforation mutually slideably mounted and a device for moving the slideable plates using a magnetically operated mechanical lever system for sequentially sliding each plate a predetermined distance.

3,648,025

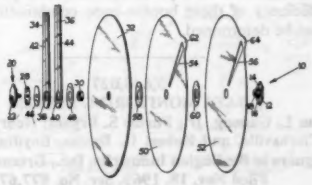
CIRCULAR SLIDE RULE

Robert P. Adams, Albany, Oreg., assignor to Albany Enterprises, Inc., Albany, Oreg.

Filed Apr. 7, 1970, Ser. No. 26,323

Int. Cl. G06c *27/00*

U.S. Cl. 235—83 **3 Claims**



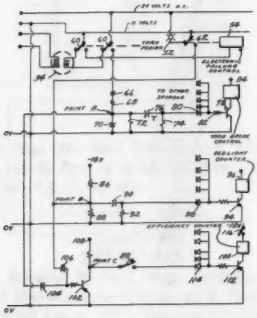
A circular slide rule comprises a central shaft having one or more information-bearing reference discs mounted thereon. A pair of overlapped cursor arms are mounted rotatably on the shaft in frictional engagement with each other, concentrically with the discs and overlying the outer face of one of them. The degree of frictional contact between the cursor arms is predetermined to cause the arms to rotate in unison about the shaft when a displacing force is applied

to one arm only, but to permit the arms to rotate relative to each other when a restraining force is applied to one while a displacing force is applied to the other. In addition, the discs are arranged for free rotation relative to each other and provided with windows arranged to permit inspection of selected areas of underlying discs.

3,648,026
DATA MONITORING SYSTEM

Fujio Abe, Wake Forest, and Clifford R. Crawford, St. Pauls, both of N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Filed Nov. 18, 1969, Ser. No. 877,674
Int. Cl. G06m *3/12*; B65h *69/04*
U.S. Cl. 235—92 PD **23 Claims**



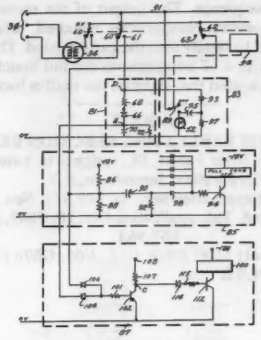
A data monitoring system for use with yarn winders and the like including a yarn-break accumulator which measures and accumulates the number of yarn-breaks which occur for each bobbin-cone combination of the winder. An indicator or red-light accumulator is provided for measuring and accumulating the number of red lights which occur as a result of the failure of the winder to successfully tie together broken strands of yarn. An efficiency monitor is provided in combination with the yarn-break accumulator and the red-light accumulator and a slub accumulator is also provided. A rejected bobbin accumulator system is provided to detect and count the number of bobbins which are rejected having residue yarn thereon. A bad knot accumulator provides an accumulated count of the number of bad knots which occur for each individual bobbin-cone combination and a scanning system is provided in conjunction with the efficiency monitor whereby a plurality of bobbin-cone combinations or spindles can be scanned over a predetermined time period whereby the efficiency of these bobbin-cone combinations in operation can be determined.

3,648,027
DATA MONITORING SYSTEM

William L. Ganong, Jr.; Furnie S. Bryant; Henry R. Neill, all of Clarksville, and Robert G. Davies, Boydton, all of Va., assignors to Burlington Industries, Inc., Greensboro, N.C.

Filed Nov. 18, 1969, Ser. No. 877,675
Int. Cl. G06m *3/02*
U.S. Cl. 235—92 QC **9 Claims**

A data monitoring system for use with yarn winders and the like including a yarn-break sensor network which senses the existence of a yarn break for each bobbin-cone or spindle combination of the winder. An indicator network or red-light network is provided for determining when a red light occurs as a result of the failure of the winder to successfully tie together broken strands of yarn. A full-cone sensor and accumulator network is provided in circuit with the yarn-break sensor network and the indicator network and an efficiency determining network is connected in circuit with the yarn-break sensor network, the indicator network and the full-

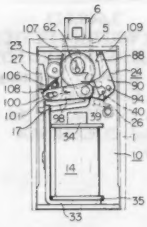


cone sensor and accumulator network for determining and indicating the efficiency of operation of the winder. A slub count accumulator system is also provided.

3,648,028
ELECTROMAGNETIC COUNTER

Kazuhiko Hara, and Hirozo Imai, both of Kadoma, Osaka, Japan, assignors to Matsushita Denko Kabushiki Kaisha, Osaka, Japan

Filed Nov. 24, 1969, Ser. No. 879,140
Claims priority, application Japan, Nov. 30, 1968, 43/87750; Dec. 24, 1968, 43/94775; 43/112827
Int. Cl. G06m *1/30*
U.S. Cl. 235—92 C **4 Claims**

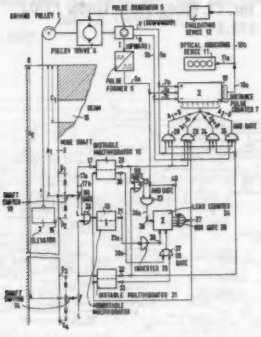


An electromagnetic counter for digitally counting applied signal pulse numbers, including resetting mechanism for simultaneously resetting a series of digit wheels to their zero position. Actuating force for the resetting mechanism is applied to a rockable first lever, which has the same number of resetting arms as that of the digit wheels for rotating them to zero position and a lever arm for rotating a rotatable frame supporting a series of pinions engaged between each of the digit wheels into pinions' disengaging position. There is provided between the lever arm of the first lever and the rotatable frame a second lever pivoted at its respective ends to them for transmitting the actuating force. The pivoting point of the first lever, respective pivoting points between the first and second levers and the second lever and rotatable pinion frame are substantially aligned on a straight line so as to make repulsing torque given to the pinions from the digit wheels to be small.

3,648,029
APPARATUS AND METHOD FOR SYNCHRONIZING DIGITAL DISTANCE PULSE COUNTERS

Friedrich Ungnadner, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Mar. 9, 1970, Ser. No. 17,564
Claims priority, application Germany, Mar. 13, 1969, P 19 12 663.7
Int. Cl. G06m *1/28*
U.S. Cl. 235—92 DN 9 Claims

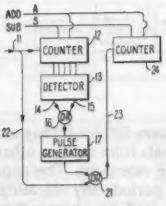


A stationary switch having a defined response time is positioned along the travel path of a moving object and provides a signal for multiplying the distance pulses corresponding to the travel position of the moving object during the response period. A lead counter is connected to a pulse generator coupled to the moving object, which produces the distance pulses, and to the switch, and stores the distance pulses and the signal provided by the switch. A distance pulse counter is coupled to the pulse generator and to the lead counter in a manner whereby the distance pulse counter is reset in accordance with the count position of the lead counter.

3,648,030
SCALE CONVERSION APPARATUS

Alexander Turnbull Shepherd, Craigleith Crescent; Laurence Philip Smith, Penicuik, and Lockhart Taylor, Hailes Gardens, all of Scotland, assignors to Ferranti, Limited, Hollinwood, Lancashire, England

Filed Sept. 16, 1969, Ser. No. 858,274
Claims priority, application Great Britain, Sept. 19, 1968, 44,476/68
Int. Cl. G06m *3/14*; H03k *21/36*
U.S. Cl. 235—92 PL 5 Claims

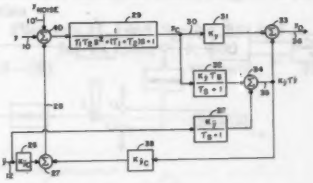


A linear scale converter for converting an input train of electrical pulses each of which represents a required elemental movement (e.g., of a machine tool) of fixed length expressed in a particular scale, such as the Imperial scale, to an output train of pulses each of which represents such movement but expressed in another scale, such as the Metric scale, where the output/input scale ratio is D/N, includes apparatus for defining each input group of N pulses and adding algebraically to it (D-N) pulses at locations spaced approximately evenly over the group, thereby providing an output group of D pulses.

3,648,031
CONTROL SYSTEM FILTERING TECHNIQUE

Gordon L. Neal, Cedar Rapids, Iowa, assignor to Collins Radio Company, Cedar Rapids, Iowa

Filed Oct. 30, 1970, Ser. No. 85,591
Int. Cl. G05b *6/02*
U.S. Cl. 235—150.1 4 Claims

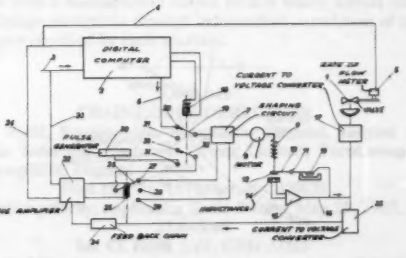


A control system filtering technique permits heavy noise filtering of a position input signal without introduction of system instabilities. A rate of change of the filtered position signal is derived and utilized in a feedback loop to complement the signal from which the rate signal was derived, permitting heavy position signal filtering without position loop phase lag and thus effectively separating the problem of generating a tight control from the sensor noise problem.

3,648,032
CONTROL INSTALLATION PROVIDING FOR SMOOTH TRANSFER BETWEEN DIGITAL AND ANALOG CONTROLS

Robert Maurice Gineste, Draveil, France, assignor to Appareils De Precision et De Controle "APC", Paris, France

Continuation of application Ser. No. 667,162, Sept. 12, 1967, now abandoned. This application May 28, 1970, Ser. No. 41,723
Int. Cl. G06j *3/00*
U.S. Cl. 235—150.5 2 Claims



A control installation comprising a digital computer receiving data on a set value and an actual value and giving indications to a decoder controlling this element and adapted to control any element, such as a valve. The installation comprises an analogue controller which is connected in parallel with the computer on the circuit receiving data on the set value and actual value, and a changeover device which is disposed before the decoder and which can provide a chan-

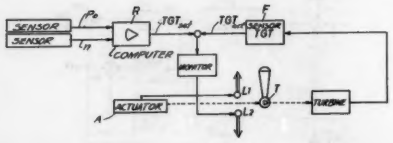
geover from control by the computer to control by the analogue controller.

3,648,033

DEVICE FOR CONTROLLING THE FUEL SUPPLY WITH PROPELLER TURBOJET ENGINES FOR AIRCRAFT BY MEANS OF A THROTTLE LEVER AND A TRIMMING LEVER

Gottfried Bader, Uberlingen, Bodensee, Germany, assignor to Bodenseewerk Geratetechnik GmbH, Uberlingen, Bodensee, Germany

Filed Apr. 17, 1970, Ser. No. 29,489
Claims priority, application Germany, Apr. 19, 1969, P 19 20 002.3
Int. Cl. F02c 9/04
U.S. Cl. 235—150.21 14 Claims



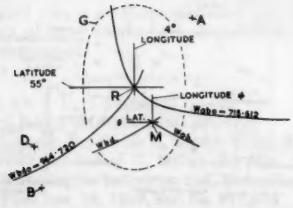
A plurality of input signals are fed to a computer which determines a "set" signal indicative of a desirable turbine gas temperature of the turbojet engine. The input signals include information as to the engine speed and the air pressure at the altitude at which the engine is operating. An "actual" signal is derived indicative of the existing turbine gas temperature and is compared with the "set" signal to produce an error signal. From the error signal indications are given to the pilot as to the movement required of the trimming lever to achieve the desirable turbine gas temperature for the conditions under which the engine is operating. The error signal can be used for automatic correction of the setting of the trimming lever.

3,648,034

NAVIGATIONAL APPARATUS

Graham John Lawson, Aldershot, England, assignor to Minister of Technology in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Nor thern Ireland

Filed Nov. 21, 1969, Ser. No. 878,848
Int. Cl. G06f 15/50
U.S. Cl. 235—150.26 10 Claims



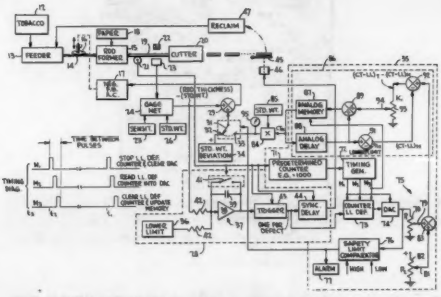
Navigational apparatus for use in a mobile craft comprises measuring means for providing electrical representations of two coordinates of the two position of the mobile craft relative to a hyperbolic navigation system, a data store for holding representations of sets of constants, selection means for selecting one of the sets, and a computer for calculating given functions of the measured coordinates and the selected constants to produce useful approximate indications of the latitude and longitude of the mobile craft. The functions may be a pair of polynomials of the second degree, each having five constants, so that there will be 10 constants in each set.

3,648,035

SYSTEM AND METHOD FOR OPTIMIZING PROCESSOR OR EQUIPMENT PROFIT

Dwight L. Hart, Worthington; Henry T. Jaggers, and Charles S. Walker, both of Columbus, all of Ohio, assignors to Industrial Nucleonics Corporation

Filed June 2, 1969, Ser. No. 829,283
Int. Cl. G06g 7/66; G05b 13/02
U.S. Cl. 235—151.1 41 Claims



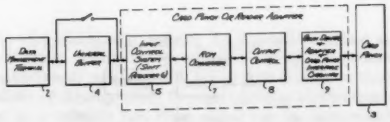
In the embodiment specifically described and illustrated, there is disclosed a system and method for maximizing the profit of a tobacco manufacturing process by computing a measure of the process spread, which can be calculated either in response to standard deviation or fraction defective. In response to the calculation of process spread, the average weight of cigarettes manufactured is controlled to maximize profit so that average weight is minimized and variable percentage of the cigarettes weigh less than a limit value. Those cigarettes weighing less than the limit value are identified and the tobacco therein is reused.

3,648,036

CARD PUNCH READER ADAPTER

Raymond Walter Limbert, Bedford, Mass., assignor to Viatron Computer Systems Corporation

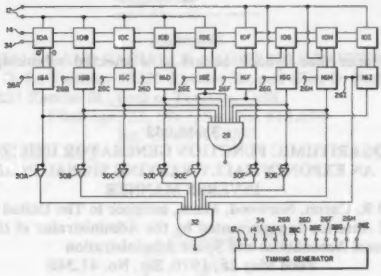
Filed Oct. 22, 1969, Ser. No. 868,469
Int. Cl. G06f 3/00
U.S. Cl. 235—154 4 Claims



A translator system for converting electrically or magnetically encoded signals from tape or other storage mediums to a punched card or vice versa. The apparatus may include a buffer circuit for periodically releasing the terminal equipment during the card punching operation or the reverse operation of translating prepunched cards to tape or other recording means. In addition, the translator circuit includes means to convert one punch card code such as the Hollerith code to a second code such as the ASCII code widely used for data transmission and the change data in a serial mode to

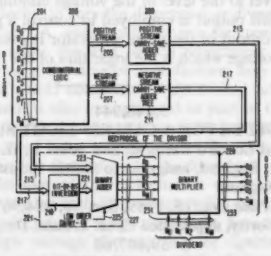
a parallel mode and vice versa. These circuits are combined with a control system which permits the translating circuit to be used to prepare or write punch cards or alternatively to translate or read already punched cards and to record the punch card data on tapes or other data storage means.

3,648,037
SYMMETRICAL FUNCTION GENERATOR
Walter Hosey Tew, Jr., Deland, Fla., assignor to General Electric Company
Filed Dec. 31, 1970, Ser. No. 103,034
Int. Cl. G06f *15/34*
U.S. Cl. 235—197 **2 Claims**



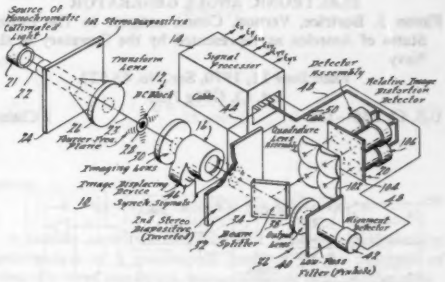
A mathematical function having horizontal symmetry is generated progressively for each vertical coordinate. A binary counter is set with the number of one horizontal coordinate for a particular vertical coordinate. Gate stages associated with each stage of the counter receive signals which set them sequentially with the numbers of all horizontal coordinates. When the gate stage number matches that contained in the counter an output signal is produced by every gate stage enabling a first AND gate. The outputs from the gate stages are also inverted to the complementary binary number and enable a second AND gate. The AND gate signals identify the two symmetrical horizontal coordinates associated with the vertical coordinate.

3,648,038
APPARATUS AND METHOD FOR OBTAINING THE RECIPROCAL OF A NUMBER AND THE QUOTIENT OF TWO NUMBERS
Hugh M. Sierra, Los Altos, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Apr. 25, 1969, Ser. No. 819,331
Int. Cl. G06f *7/39, 7/38*
U.S. Cl. 235—164 **7 Claims**



Apparatus and method for obtaining the reciprocal of a number and the quotient of two numbers is disclosed. The dividend and divisor, after left justification of the most significant "one" of each, are supplied to an array of combinatorial logic, the output of which is a group of polynomials having positive and negative terms. Arithmetic means are provided for subtracting the negative terms of the polynomials from the positive terms thereof to obtain the reciprocal of the divisor. This reciprocal may thereafter be multiplied by the dividend by well-known multiplication means to form the desired quotient. The apparatus and method perform the described arithmetic functions according to a flow-through scheme, where a flow-through scheme is defined as a scheme not requiring iterative techniques.

3,648,039
OPTICAL CORRELATOR FOR AUTOMATIC STEREOPLOTTING APPARATUS
Daniel C. Kowalski, Southgate, Mich., assignor to The Bendix Corporation
Filed July 11, 1969, Ser. No. 841,085
Int. Cl. G06g *7/19, 9/00*
U.S. Cl. 235—181 **16 Claims**

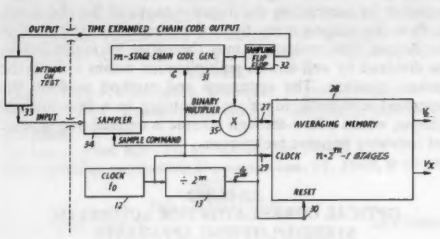


A coherent optical correlator having a canted optical flat for optically displacing the imagery on one transparency of a stereo pair with respect to the imagery on the other transparency. The canted optical flat is rotatable such that the image is displaced in a circular path. Image misalignment is computed by multiplying the output signal of the correlator by sine and cosine functions which are in synchronism with the rotating optical flat. The optical correlator is also provided with a multiaperture output section which detects relative image distortions through independent correlation of the imagery received by each aperture.

3,648,040
CHAIN-CODE CORRELATOR
Ivar Weld, Farnborough, Hampshire, England, assignor to The Solartron Electronic Group Limited, Farnborough, Hampshire, England
Filed May 26, 1970, Ser. No. 40,638
Claims priority, application Great Britain, May 28, 1969, 27,045/69
Int. Cl. H03k *5/18*; G01r *31/28*
U.S. Cl. 235—181 **5 Claims**

A chain-code correlator for determining the response of apparatus such as servomechanisms to command signals has a chain-code generator of m stages and clock-frequency f_c connected through a first sampler to an output circuit connected to apparatus to be tested. The sampler provides samples of the code at a recurrence frequency $f_c/2^m$. An input from the apparatus under test is connected through a synchronized second sampler to a multiplier where it is multiplied by the chain code. The output of the multiplier is ap-

plied to an averaging memory of 2^m-1 stages giving the correlation function for (2^m-1) time delays at increments of $1/f_o$. Only m shift registers are required for (2^m-1) time delays.

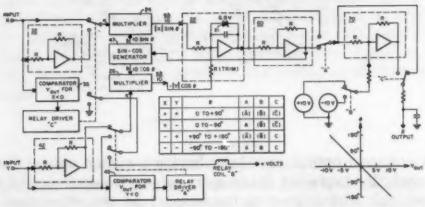


3,648,041

ELECTRONIC ANGLE GENERATOR

Finton J. Beatrice, Vernon, Conn., assignor to The United States of America as represented by the Secretary of the Navy

Filed June 11, 1970, Ser. No. 45,521
Int. Cl. G06g 7/22
U.S. Cl. 235—186 2 Claims



An electronic angle generator for generating an output voltage proportional to an angle, the tangent of which is a ratio of the two input voltages to the generator, comprising multipliers and function generators utilized for solving the equation $X \sin \theta = Y \cos \theta$ by closed loop action (implicit computation).

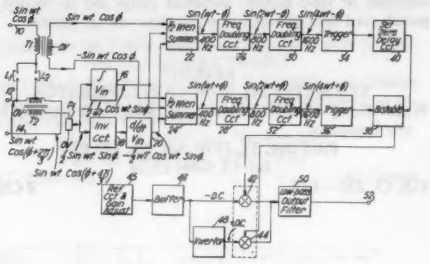
3,648,042

APPARATUS FOR SIGNALLING ANGULAR DISPLACEMENT

Brian Raymond Perrett, Radstock, England, assignor to British Aircraft Corporation Limited, London, England

Filed Mar. 31, 1970, Ser. No. 24,147
Claims priority, application Great Britain, Apr. 16, 1969, 19,435/69
Int. Cl. G06g 7/22
U.S. Cl. 235—189 8 Claims

To signal the angle displacement of the synchro transmitter or resolver rotor, signals representing products of trigonometrical functions of the supply voltage angle ωt and the rotor angle ϕ are processed until they can be combined to give a resultant sin $(\omega t \pm \phi)$ or cos $(\omega t \pm \phi)$ and the resultant is then compared with sin ωt or cos ωt to obtain the rotor angle ϕ. Parallel integrator and differentiator circuits in the processing unit prevent substantial amplitude change with frequency drift. Frequency doubling circuits are used in such a manner that flyback occurs at a selected submultiple of 180°.

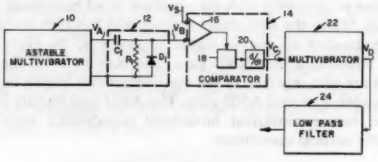


3,648,043

LOGARITHMIC FUNCTION GENERATOR UTILIZING AN EXPONENTIALLY VARYING SIGNAL IN AN INVERSE MANNER

Paul R. Caron, Norwood, Mass., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration

Filed May 28, 1970, Ser. No. 41,348
Int. Cl. G06g 7/26, 7/24
U.S. Cl. 235—197 11 Claims



A technique which utilizes an exponentially varying electrical signal in an inverse manner to derive the logarithm of an input signal is disclosed. In a preferred embodiment of apparatus utilizing the technique, a voltage commensurate with an input signal is compared with an exponentially decaying voltage to provide an output proportional to the time required for the exponential voltage to fall from a preset reference level to the level of the voltage commensurate with the input. This output is employed to control a pulse generator and the output of the pulse generator is averaged to provide a DC voltage which is the logarithm of the input signal.

3,648,044

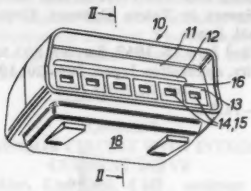
HOLDER FOR A CAPLESS LIGHT BULB

Dominic Paul Edward Barnard, and Brian L. H. Bishop, both of Witney, England, assignors to Smiths Industries Limited, London, England

Filed Dec. 15, 1969, Ser. No. 884,967
Claims priority, application Great Britain, Dec. 13, 1968, 59,407/68
Int. Cl. B60q 3/04
U.S. Cl. 240—8.16 9 Claims

A holder for a capless light bulb constructed so as to permit light from a capless light bulb held by the holder to

emanate from both the bulbous portion and the pinched portion of the capless light bulb. Indicator apparatus incorporating such a holder is also described.

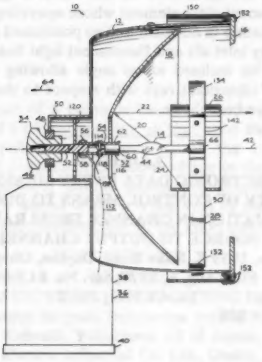


3,648,045

AXIALLY AND RADIALLY ADJUSTABLE LANTERN

Allan D. Le Vantine, 18225 Rancho St., and Glen D. Benskin, 18233 Rancho St., both of Tarzana, Calif.

Filed Apr. 23, 1969, Ser. No. 818,654
Int. Cl. F21l 11/00
U.S. Cl. 240—44.2 9 Claims



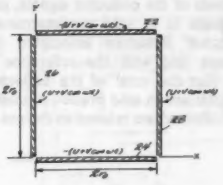
A portable handheld searchlight for providing a high-intensity beam of electromagnetic radiation for comparatively long periods of time from a self-contained, easily portable power source. A Xenon gas discharge lamp is utilized as the source of electromagnetic radiation in the searchlight and it is reflected therefrom by a conventional parabolic reflector. Mechanical adjustments are provided for moving the Xenon lamp along the axis of the parabolic reflector to points closer thereto and further therefrom than a focal point of the parabolic reflector to vary the dispersion or divergence of the reflected beam. A radial adjustment for positioning the Xenon lamp along the axis, which adjustment is generally only made once at the time of manufacture, may also be provided. A light shield comprising a cylindrical tubing around the Xenon lamp is also incorporated as part of the structure to intercept the electromagnetic radiation emitted from the lamp that has not been reflected from the reflector and allows transmission thereof only in directions substantially parallel to the axis of the reflector. A complete electrical power supply system including a battery for providing electrical energy, and circuitry for providing the functions of comparatively high voltage for starting or igniting the gas discharge lamp and intermediate parallels of electrical energy to the lamp after ignition but prior to steady state operation, and also electrical energy of a comparatively low voltage for sustained steady state operation.

3,648,046

QUADRUPOLE GAS ANALYZER COMPRISING FOUR FLAT PLATE ELECTRODES

Dean R. Denison, and Charles F. Morrison, Jr., both of Boulder, Colo., assignors to Granville-Phillips Company, Boulder, Colo.

Filed May 18, 1970, Ser. No. 38,076
Int. Cl. B01d 59/44
U.S. Cl. 250—41.9 DS 15 Claims



A quadrupole analyzer wherein the trajectory stability of the charged particles is determined by two parameters a and q where

$$a = \frac{eU}{Kmw^2r_0^2}$$

and

$$q = \frac{eV}{2Kmw^2r_0^2}$$

where

K = any value except $0.125 \leq K \leq 0.126$.

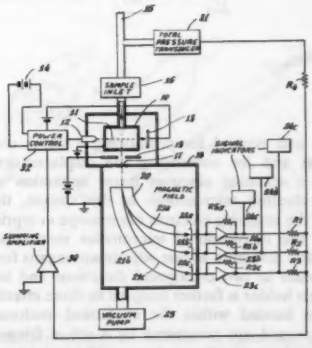
A further aspect of the invention relates to performance optimization of a quadrupole analyzer in the presence of relatively large amplitude, nonquadrupole field components.

3,648,047

SENSITIVITY CONTROL FOR MASS SPECTROMETER

Bliss M. Bushman, Claremont, and Wayne J. Whistler, Glendora, both of Calif., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed July 13, 1970, Ser. No. 54,095
Int. Cl. H01j 39/34
U.S. Cl. 250—41.9 G 7 Claims



In a mass spectrometer wherein gases of a mixture are ionized and respective ion beams are directed to collector plates or cups to generate proportional signals for determin-

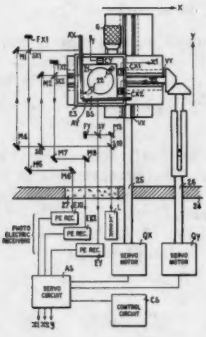
ing the relative amounts of the several gases in the mixture, the sensitivity of the collector cup signals is maintained by adjusting the ionizing power supply as required to maintain the total of the signals from the collector plates or cups substantially equal to a reference signal. The total of the collector signals are compared with the reference signal by a summing amplifier. When the compared signals differ from a predetermined relation (e.g., equality) a proportional output signal is generated and applied to power control means to vary the level of power applied to ionize the mixture, and hence the levels of the collector signals, until the total of the collector signals is in said predetermined relation to the reference signal. Resistors associated with the collector plates or cups and with the reference signal source are selected so that the total of the collector signals and the reference signal are in said predetermined relation when the ion species collected are related to the gas species of interest.

3,648,048

SYSTEM AND METHOD FOR POSITIONING A WAFER COATED WITH PHOTORESIST AND FOR CONTROLLING THE DISPLACEMENTS OF SAID WAFER IN A SCANNING ELECTRON APPARATUS

Olivier Cahan, Gif-sur-Yvette; Jean-Edgar Picquendar, Saint-Remy-Les Chevreuse, and Georges Pircher, Gif-sur-Yvette, all of France, assignors to Compagnie Francaise Thomson Houston-Hotchkiss Brandt, Paris, France

Filed Oct. 15, 1969, Ser. No. 866,506
Int. Cl. H01j *37/20*
U.S. Cl. 250—49.5 A **6 Claims**



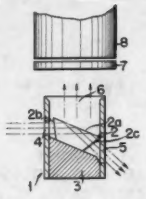
System and method for positioning a wafer coated with photoresist and for controlling the displacements of this wafer in a scanning electron beam apparatus such as a scanning electron microscope. In this system, the sample holder of the scanning electron microscope comprises, in addition to the conventional micrometer mechanisms, three piezoelectric actuators as fine adjustment means for positioning the wafer in two orthogonal directions and in rotation. The sample holder is further coupled to three interferometers which are located within the evacuated enclosure of the microscope and are monitored by a set of fringe counting units located outside the enclosure. The provision of a programmer and of a servocontrol system allow the displacements of the wafer to be automatically controlled and measured.

3,648,049

DOSIMETER USING A FLUORESCENT GLASS ELEMENT

Ryosuke Yokota, and Yuhei Muto, both of Yokohama-shi, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan

Filed June 16, 1969, Ser. No. 833,621
Claims priority, application Japan, June 20, 1968, 43/42381
Int. Cl. G01t *1/06*
U.S. Cl. 250—71.5 R **3 Claims**



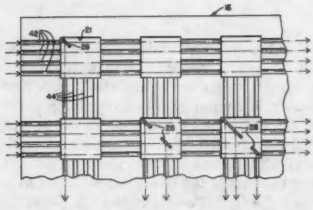
This dosimeter comprises a vessel having an inlet slit and outlet slit for ultraviolet rays and a slit for releasing fluorescent light beams which is opened in a direction almost perpendicularly intersecting the direction in which the ultraviolet rays are introduced. In said vessel is housed a trapezoidal fluorescent glass element whose operating plane is exposed to radiation in advance and so positioned as to face the ultraviolet-ray inlet slit and fluorescent light beam release slit and also to be inclined at an angle allowing for the total reflection of ultraviolet rays with respect to the direction in which they are brought in.

3,648,050

OPTOELECTRONIC DATA ENTRY MEANS HAVING PLURALITY OF CONTROL MEANS TO DIRECT PART OF RADIATION IN CHANNEL FROM RADIATION SOURCE TO OUTPUT CHANNEL

Tuh-Kai Koo, 1039 E. Rahn Road, Dayton, Ohio

Filed Aug. 6, 1970, Ser. No. 61,646
Int. Cl. H01j *39/12*
U.S. Cl. 250—208 **11 Claims**



An optoelectronic data entry means which employs radiation and radiation-responsive elements as a means of converting information from manually entered form to electrical signal form. A plurality of data entry elements are mounted in chambers in a housing in row-and-column arrangement. A plurality of communication channels and output channels are disposed in a generally planar orientation in the housing. The communication channels provide access from a source of radiation to the chambers in which the data entry elements are disposed, and the output channels provide radiation paths from said chambers to a plurality of detectors capable of converting the radiation to electrical signals. Beam splitting devices mounted on the inner ends of the data entry elements are effective, upon selective operation of the data entry elements, to deflect a portion of the radiation admitted to the

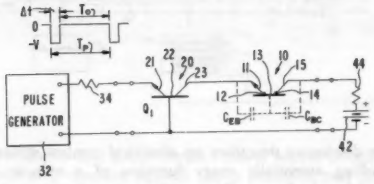
chambers through the communication channels into the output channels for detection by the corresponding detectors, while permitting another portion of said radiation to pass through said beam splitters for possible interception by the beam splitter of another data entry element associated with the same communication channel. Two arrangements are disclosed, one of which includes mechanical encoding of the input information.

3,648,051

PHOTOSENSOR CIRCUIT WITH INTEGRATED CURRENT DRIVE

Gene P. Weckler, Campbell, Calif., assignor to Fairchild Camera and Instrument Corporation, Mount View, Calif.

Filed Mar. 3, 1970, Ser. No. 16,173
Int. Cl. H01j *39/12*
U.S. Cl. 250—211 J **6 Claims**



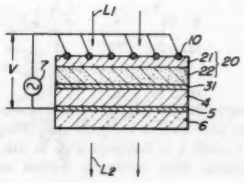
The collector of a common-base transistor is coupled to the emitter of a phototransistor, so that upon the application of suitable pulses to the emitter of the common-base transistor and a source of constant voltage to the collector of the phototransistor, output pulses are generated by the phototransistor whose width is a function of photon flux incident to the unconnected base of the phototransistor.

3,648,052

SOLID-STATE IMAGE-CONVERTING DEVICE

Tadao Nakamura; Shigeaki Nakamura, both of Kawasaki-shi, and Tadao Kohashi, Yokohama, all of Japan, assignors to Matsushita Electric Industrial Co. Ltd., Osaka, Japan

Filed Jan. 22, 1969, Ser. No. 793,048
Int. Cl. H01j *31/50*
U.S. Cl. 250—213 R **6 Claims**



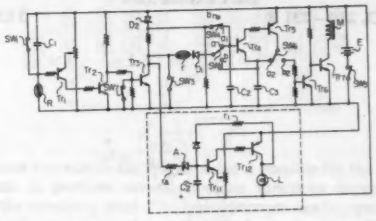
A solid-state image-converting device comprising an energy-sensitive layer and a luminescent element whose luminescence is controlled in response to the variation of the impedance of said energy-sensitive layer, in which said energy-sensitive layer is a composite layer consisting of a layer for sensing the incident energy and a photoconductive layer responding to the light fed back from said luminescent element, thereby to improve the sensitivity of the device greatly.

3,648,053

WARNING CIRCUIT FOR USE IN A TTL-TYPE ELECTRONIC SHUTTER

Takayoshi Sato, Tokyo, Japan, assignor to Kabushikikaisha Copal, Tokyo, Japan

Filed Nov. 6, 1970, Ser. No. 87,411
Claims priority, application Japan, Nov. 14, 1969, 44/91710
Int. Cl. G01j *1/00, 1/52;* H01l *39/12*
U.S. Cl. 250—214 P **10 Claims**



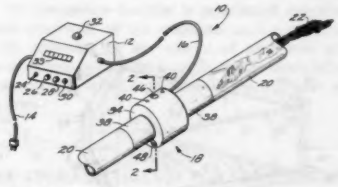
Warning circuit for use in a TTL-type electronic shutter having an integrating circuit, a memory circuit, an exposure control circuit and a switching circuit for actuating shutter blades for the proper exposure in accordance with the intensity of light received by a photoelectric element of the integrating circuit adapted to receive the light from the object through the objective of a camera. The memory circuit provides a reference voltage in accordance with the reference time set in the integrating circuit in response to the intensity of light. The warning circuit comprises a series circuit of a resistor and a capacitor and a transistor connected to the series circuit and adapted to energize pilot means when triggered. The series circuit is connected to the memory circuit so as to be actuated during the reference time while the transistor is triggered when the voltage of the capacitor reaches the triggering voltage of the transistor. The emitter bias of the transistor is set to either of the upper limit or the lower limit of the shutter speed, so that the improper condition of the scene brightness for the proper exposure is detected by inspecting whether or not the pilot means is energized.

3,648,054

ARTICLE DETECTING AND COUNTING APPARATUS

Robert L. Nance, Burlington, N.C., assignor to AMF Incorporated, New York, N.Y.

Filed June 12, 1970, Ser. No. 45,704
Int. Cl. G06m *7/00*
U.S. Cl. 250—223 R **6 Claims**



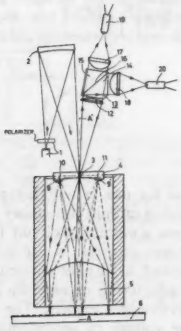
Pneumatically conveyed knitted articles are accurately counted by inexpensive apparatus including protectively mounted photoelectric components and controls for adjusting the magnitude and maximum frequency of signals transmitted therefrom to a counting device.

3,648,055

APPARATUS FOR DETERMINING THE RELATIVE MOVEMENT OF AN OBJECT WITH THE USE OF AN OPTICAL GRATING RIGIDLY SECURED TO THE OBJECT

Hendrik De Lang, Delft, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 4, 1969, Ser. No. 796,508
Claims priority, application Netherlands, Feb. 6, 1968, 6801683
Int. Cl. G01d *5/34*
U.S. Cl. 250—231 R 3 Claims



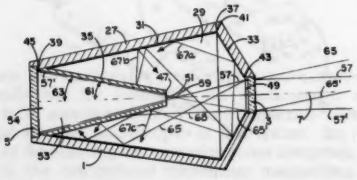
The invention relates to an apparatus for determining the relative movement of an object with the use of an optical grating rigidly secured to the object, in which energy emanating from a source of energy interacts with the grating and then is supplied to a system which is sensitive to this energy and converts it into an electric signal which is a periodic function of the movement of the objects characterized in that a second optical grating the periodic direction of which is at right angles to that of the first grating covers this first grating and is substantially coplanar with it.

3,648,056

OPTICAL DETECTOR WITH RADIANT ENERGY ABSORBING CHAMBER

Thomas B. Buttweiler, Albertville, and Joseph S. Titus, Minnetonka, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 12, 1970, Ser. No. 2,138
Int. Cl. H01j *15/00*
U.S. Cl. 250—239 4 Claims



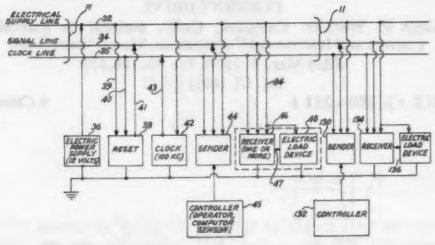
Apparatus for protecting an electro-optical detector from sources of radiant energy located off the primary optical axis is provided so as to take advantage of the focusing characteristics of the primary optical components to direct desired radiation in a cavity designed and located to receive the focused off-axis radiant energy and cause it to dissipate by absorption during a number of reflections.

3,648,057

VEHICULAR PLEX-PATH CIRCUMFERENTIAL CONTROL AND DISTRIBUTION SYSTEM

Peter W. Sognefest, Glenshaw, and Bay E. Estes, III, Murrysville, both of Pa., assignors to Essex-International Inc.

Filed Aug. 17, 1970, Ser. No. 64,282
Int. Cl. H02j *1/08*
U.S. Cl. 307—10 R 3 Claims



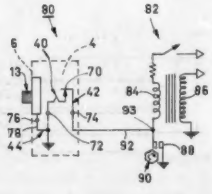
The disclosure describes an electrical control system for controlling essentially every function of a vehicle. In a preferred embodiment, the invention comprises a single harness formed of an electrical signal transmission path and an electrical power transmission path connected to a source of electrical power, control means for applying coded control signals to the electrical signal transmission path, and receiving means connected to the electrical signal and power transmission paths for receiving said coded electrical signals to selectively activate electrical switching means to operate desired load devices for performing selected vehicle functions.

3,648,058

PROTECTIVE SWITCH DEVICE

Fred R. Schraff, 16526 St. Anthony, Cleveland, Ohio

Filed Nov. 6, 1969, Ser. No. 874,633
Int. Cl. H02g *3/00*
U.S. Cl. 307—10 AT 1 Claim



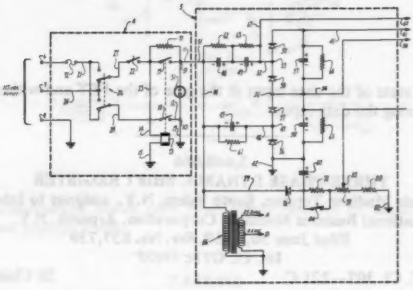
A switching device adapted for use in the ignition system of a motor vehicle including a socketlike mounting member adapted to be mounted in grounded relation on the motor vehicle. A pluglike switching member including a studlike portion adapted for insertion into said socketlike member, and contact means operably associated with said socketlike member and said pluglike member to effectively ground the ignition system in the noninstalled position of said pluglike member in said socketlike member.

3,648,059

POLARITY CONTROL ELECTRIC POWER SUPPLY CIRCUIT

Harvey James Beaudry, Fremont, and Robert M. Waldtlow, Oakland, both of Calif., assignors to International Plasma Corporation

Filed June 3, 1970, Ser. No. 43,136
Int. Cl. H02j 1/00
U.S. Cl. 307—127 4 Claims



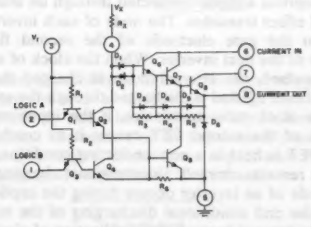
A transformerless direct-coupled power supply circuit having built-in protection against faulty potential and ground side connections to the power supply mains and including a protective normally open relay which is closed to supply power only when proper potential and ground connections are made to the power supply mains.

3,648,060

TRANSISTORIZED CURRENT SWITCH FOR MEMORY SYSTEMS

Thomas E. Hagen, Saugerties, N.Y., assignor to Ferroxcube Corporation, Saugerties, N.Y.

Filed Aug. 21, 1970, Ser. No. 66,016
Int. Cl. H03k 17/00, 19/36
U.S. Cl. 307—215 4 Claims



A transistorized current-switching device energizable by means of two logic inputs coupled to first and second stage transistors which are in turn coupled to a three-stage direct-coupled transistor switch provided with diode interstage coupling.

3,648,061

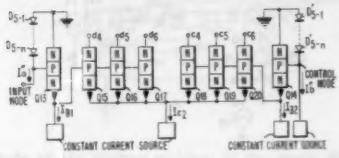
ALL TRANSISTOR LOGIC EMPLOYING TRANSISTORS OF A SINGLE-CONDUCTIVITY-TYPE

John C. Black, Endwell, and Frederick Buckley, Endicott, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 19, 1970, Ser. No. 38,742
Int. Cl. H03k 19/22
U.S. Cl. 307—218 9 Claims

A logic element fabricated entirely of transistors of a single-conductivity-type and having logic states represented by two ranges of current levels. The transistors are operated in their linear regions and have reference currents passing therethrough for establishing the operating current levels of the logic element.

A logic element has one or more current inputs as well as one or more current outputs. Each of the input currents is at or below a predetermined level. The adjustment of the



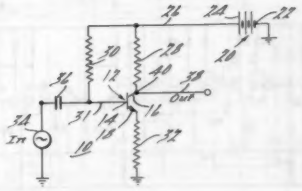
reference currents in the system make it possible for the logic element to perform several Boolean functions depending upon the operating level. The logic elements can be operated with a reference current such that the logic element will perform the logic "OR" function. In addition, the reference current may be adjusted such that either a majority logic function or an "AND" function may also be performed.

3,648,062

WIDE-BAND NONINDUCTIVE FREQUENCY DOUBLER

Michael Bozoian, Ann Arbor, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Nov. 16, 1970, Ser. No. 89,974
Int. Cl. H03b 19/14
U.S. Cl. 307—220 11 Claims



A wide-band noninductive electronic frequency double including a single transistor connected in emitter-follower configuration. Resistor means are connected to the base electrode of the transistor and a source of electrical energy for applying a heavy forward bias to the base. The output terminal for the frequency doubler is positioned intermediate the collector electrode of the transistor and a resistor that connects the collector to the source of electrical energy. Frequency-doubling occurs as a result of the cumulative effect of the heavy forward bias and the emitter-follower action of the transistor.

3,648,063

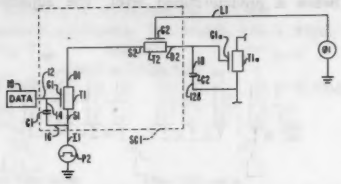
MODIFIED STORAGE CIRCUIT FOR SHIFT REGISTER

William K. Hoffman, Shelburne, and John W. Sumilas, Williston, both of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 28, 1970, Ser. No. 6,497
Int. Cl. G11c 19/00
U.S. Cl. 307—221 C 10 Claims

A field effect transistor (FET) shift register storage circuit has a first and second FET series connected from the drain of the first FET to the source of the second FET. A storage capacitor is connected between the gate and source of the first FET. A pulse source is connected to the source of the first FET, and data stored on the capacitor is supplied to the

gate of the first FET. A clocking pulse source is connected to the gate of the second FET and is adapted to provide a clocking pulse to the second FET in overlapping relationship to a pulse from the pulse source supplied through the first



FET for a storage capacitor of a subsequent storage circuit. In this arrangement, both data input to the storage cell and a pulse for the storage capacitor of a subsequent storage circuit are to the first FET. This storage circuit is both very compact and of simplified structure in integrated form.

3,648,064

MULTIPLE SIGNAL LEVEL HIGH-SPEED LOGIC CIRCUIT DEVICE

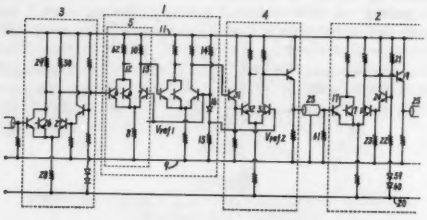
Hisakazu Mukai; Hideaki Kindo; Yoshimasa Sugahara, and Akinori Yamagata, all of Tokyo, Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed June 30, 1969, Ser. No. 837,620

Claims priority, application Japan, July 1, 1968, 43/45101; July 5, 1968, 43/46469; Sept. 21, 1968, 43/68124

Int. Cl. H03k *19/08, 19/34, 19/22*

U.S. Cl. 307—213 **5 Claims**



A multiple signal level high-speed logic circuit device wherein the logic gates within a block operate under both small- and high-logic signal swings through a direct coupling configuration. The small logic signal swing is supplied from a low-voltage electric source, and the interconnections between the respective blocks are made through voltage-level converting circuits which use PN-junction level shifts.

3,648,065

STORAGE CIRCUIT FOR SHIFT REGISTER

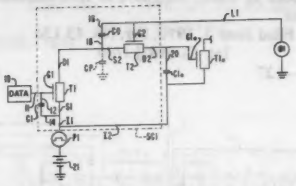
William K. Hoffman, Shelburne, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 28, 1970, Ser. No. 6,496

Int. Cl. G11c *19/00*

U.S. Cl. 307—221 C **18 Claims**

A shift register storage circuit is provided with first storage means connected to the gate of a first field effect transistor (FET) in which a pulse for another storage means of a subsequent storage circuit is supplied through the same FET independent of the state of the first storage means. In an embodiment, this is accomplished by connecting a source of the pulses to a current flow electrode of the first FET, and connecting this current flow electrode through a capacitor to the gate electrode of the first FET. A second FET serves as an isolating switch between the first FET and the storage means of a subsequent storage circuit. In this arrangement, the pulses may be applied through the first FET independently of



the state of the data input at the gate of the FET and without altering the data input.

3,648,066

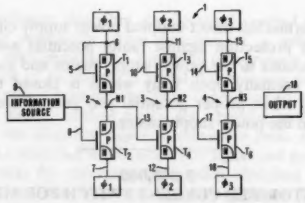
THREE-PHASE DYNAMIC SHIFT REGISTER

Lewis Madison Terman, South Salem, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1969, Ser. No. 837,739

Int. Cl. G11c *19/00*

U.S. Cl. 307—221 C **20 Claims**



A three-phase shift register comprising three-pulsed inverter stages is disclosed. More specifically, in a first embodiment, each inverter stage comprises a first field effect transistor connected through an internal node to a second field effect transistor. In a second embodiment, each inverter stage comprises a diode connected through an internal node to a field effect transistor. The node of each inverter is connected to the gate electrode of the second field effect transistor of the next inverter. When the clock of an inverter stage is pulsed, the internal node is charged through the diode or first FET and is discharged through the second FET when the clock pulse terminates, if the input on the gate electrode of the second FET causes it to conduct. If the second FET is held in a nonconducting condition, the internal node remains charged. Unconditional charging of the internal node of an inverter occurs during the application of a clock pulse and conditional discharging of the node occurs during the interval between the application of clock pulses to the different phases. Clock pulses are applied to inverters in sequence to advance an information bit through the register stage. The transistor devices shown may be PNP- or NPN-enhancement mode field effect transistors.

3,648,067

GATED VARIABLE POLARITY REVERSING RAMP GENERATOR

Wayne A. Sullivan, and Donald A. Scolaro, both of Fort Lauderdale, Fla., assignors to The Bendix Corporation

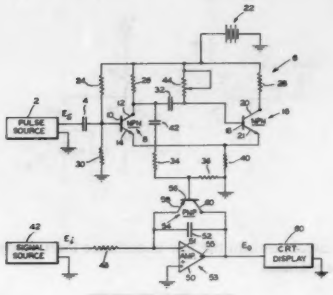
Filed July 30, 1970, Ser. No. 62,221

Int. Cl. H03k *4/08*

U.S. Cl. 307—228 **1 Claim**

A gated, variable polarity, reversing ramp generator circuit wherein a positive and negative sweep such as used in a cathode-ray tube display of aircraft navigational data is con-

trolled by positive and negative input voltage excursions about zero. A feature of the circuit is that there are no

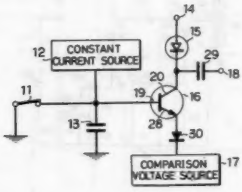


discontinuities about zero from either positive or negative input voltage levels.

3,648,068
COMPARISON AMPLIFIER

Naohisa Nakaya, Tokyo, Japan, assignor to Iwatsu Electric Co., Ltd., Tokyo, Japan

Filed May 8, 1969, Ser. No. 823,078
Claims priority, application Japan, May 28, 1968, 43/36163
Int. Cl. H03k *4/50, 4/78, 5/153*
U.S. Cl. 307—228 **8 Claims**



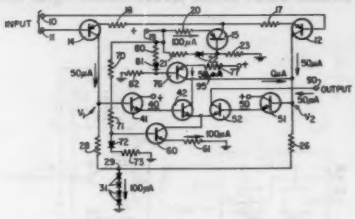
A comparison amplifier includes a transistor whose emitter and base are fed with a comparison voltage and an input signal respectively and whose collector is connected to an output terminal. The emitter of the transistor is connected to signal ground through a diode whose capacitance is smaller than the base-emitter capacitance of the transistor.

3,648,069
DIFFERENTIAL TRIGGER CIRCUIT

Thomas M. Frederiksen, Scottsdale, Ariz., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Oct. 13, 1970, Ser. No. 80,272
Int. Cl. H03k *5/20*
U.S. Cl. 307—235 **13 Claims**

An integrated, differential, symmetrical-hysteresis trigger circuit includes an input differential amplifier using lateral PNP-transistors, driving an output differential switch using cascaded NPN-transistors. A first current source supplies operating current to the input differential amplifier and a second current source provides operating current for the emitters of the transistors in the output differential amplifier. The collector of one of the output differential amplifier transistors is connected to a third current source, providing current which is less than that provided by the first and second current sources; and a feedback circuit provides snap-action switching of the output differential amplifier. The hysteresis of operation of the circuit is controlled by the

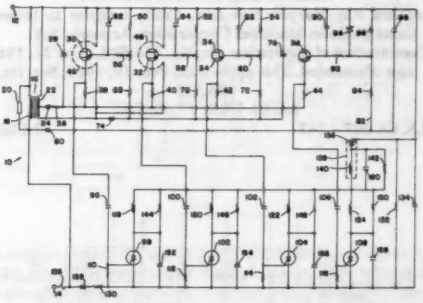


magnitude of the emitter resistors in the input differential stage.

3,648,070
STRUCTURE FOR AND METHOD OF VOLTAGE DIP COUNTING

Dennis R. Eicher, Muscatine, Iowa, assignor to The Detroit Edison Company, Detroit, Mich.

Filed Nov. 20, 1969, Ser. No. 878,361
Int. Cl. H03k *5/20*
U.S. Cl. 307—235 **7 Claims**



The number of voltage dips of an alternating source of electrical energy of a plurality of separate magnitude are counted in accordance with the method of the invention with the structure of the invention. A reference voltage is produced from the source of electrical energy of substantially the root means square voltage of the source of electrical energy and the reference voltage is compared with each single cycle voltage in separate comparison circuits for each of a number of selected voltage dip magnitudes to provide output signals each time the single cycle voltage dips below the selected magnitudes of the separate comparison circuits and the output signals of each comparison circuit is counted separately. The comparison is accomplished in unijunction transistors which may be compensated for temperature change while the counting is accomplished by counters energized through silicon-controlled rectifiers in series with the counters.

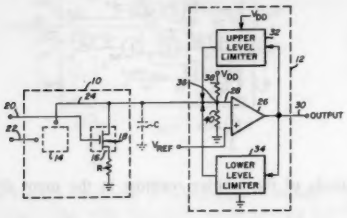
3,648,071
HIGH-SPEED MOS SENSE AMPLIFIER

Dale A. Mrazek, Los Altos Hills, Calif., assignor to National Semiconductor Corp., Santa Clara, Calif.

Filed Feb. 4, 1970, Ser. No. 8,474
Int. Cl. H03k *5/08*
U.S. Cl. 307—237 **6 Claims**

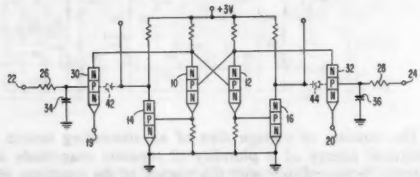
An improved sense amplifier comprised of an all FET amplifying circuit having means for limiting the voltage swing of

the read potential applied thereby to an integrated circuit memory array in sensing the stored "1" and "0" memory states. The amplifier includes upper and lower output level-limiting circuits which detect predetermined signal levels in



the output signal of the amplifier and cause the impedances at the input of the amplifier to be adjusted to limit the output signal swing of the amplifier to within the predetermined signal leads. In so doing, the memory read potential is also constrained to swing within certain predetermined limits.

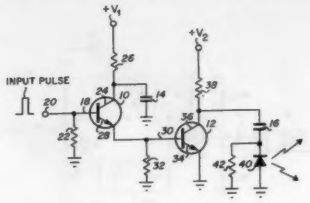
3,648,072
HIGH-SPEED GATING CIRCUIT
Leonard Roy Harper, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.
Continuation of application Ser. No. 465,592, June 21, 1965, now abandoned. This application Feb. 19, 1969, Ser. No. 804,355
Int. Cl. H03k *17/00, 3/12*
U.S. Cl. 307—247 **3 Claims**



A gating circuit suitable for operating a circuit such as a bistable multivibrator at high speed wherein a gating transistor has a small capacitor coupled between the base of the transistor and ground. A gating pulse is coupled through a resistor to the base of the gating transistor to temporarily store a charge in the capacitor. A set pulse signal applied in the next instant of time to the emitter of the gating transistor causes the gating transistor to be turned on to produce at the collector of the gating transistor, a current pulse that is sufficient to control the bistable multivibrator circuit.

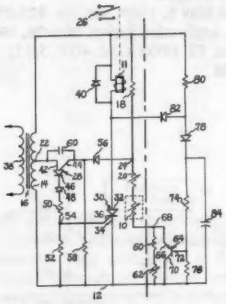
3,648,073
PULSE DRIVER CIRCUIT APPARATUS
Gerald R. Sams, Atherton, and Robert H. Watson, San Jose, both of Calif., assignors to Gerald R. Sams, Atherton, Calif.
Filed Sept. 17, 1968, Ser. No. 760,270
Int. Cl. H03k *17/60*
U.S. Cl. 307—246 **2 Claims**

Pulse driver circuit apparatus of the type suited for use as a means to energize GaAs laser diodes and the like wherein a first transistor operated in the avalanche mode is used to rapidly inject a stored quantity of charge into the base of a power transistor which serves as a gate for discharging a



second capacitor into the low-impedance laser diode or other output apparatus.

3,648,074
ON-OFF CONTROLLER WITH SOLID-STATE DIFFERENTIAL CIRCUIT
Richard K. Nurnberg, Norristown, Pa., assignor to Robertshaw Controls Company, Richmond, Va.
Filed May 4, 1970, Ser. No. 34,128
Int. Cl. H03k *17/00;* **H05b** *1/02;* **G05d** *23/00*
U.S. Cl. 307—252 N **9 Claims**

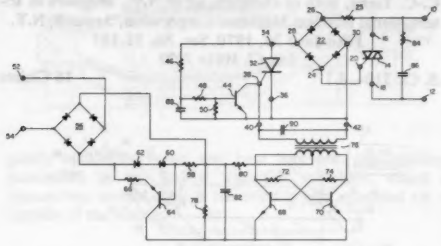


An on-off controller energized from an alternating current source with differential operation. The differential operation is obtained by using a solid-state circuit which introduces a resistance change in the circuitry in response to the on and off mode of the controller. The solid-state circuitry when conducting shunts the resistance used to provide the desired differential action. The shunt is removed when the solid-state circuitry is not conducting. Termination of the conducting state of the solid-state circuitry is delayed for two cycles of the alternating current. This eliminates the possibility of such termination being initiated by change in the on-off mode of the controller due to a spurious signal and prevents termination during the nonconducting portion of the alternating current cycle which is present when the controller is in the on mode.

3,648,075
ZERO VOLTAGE SWITCHING AC RELAY CIRCUIT
Roy J. Mankovitz, Tarzana, Calif., assignor to Teledyne, Inc., Los Angeles, Calif.
Filed June 1, 1970, Ser. No. 42,383
Int. Cl. H03k *17/00*
U.S. Cl. 307—252 B **10 Claims**

An AC relay circuit is disclosed which includes a triac as its active switch element. A full wave rectifier is connected between one of the primary terminals and the gate terminal of the triac. A control switch is provided between the load

terminals of the rectifier. First control means are provided which are responsive to an input control signal for closing the control switch, thereby triggering the triac into conduction.



Second control means are provided for rendering the control switch nonresponsive to the first control means whenever the magnitude of the AC voltage to be controlled exceeds a predetermined value.

3,648,076

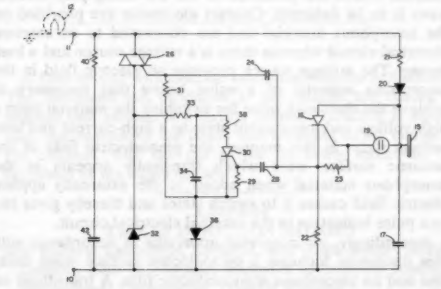
CAPACITANCE-RESPONSIVE CONTROL SYSTEM

John M. Lester, 208 Roxbury Road, Garden City, N.Y.

Continuation-in-part of application Ser. No. 807,243, Mar. 14, 1969, now abandoned. This application June 4, 1970, Ser. No. 43,434

Int. Cl. H03k *17/00, 17/56*

U.S. Cl. 307—252 B **11 Claims**



A capacitance-responsive control system embodying a pulse generator, an electronic switch, an electronic latching circuit and a shorting circuit is disclosed.

3,648,077

CIRCUIT FOR CONTROLLING A HEAT-GENERATING DEVICE

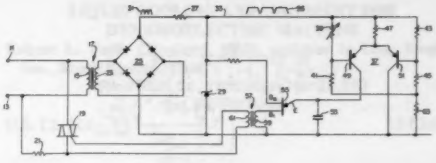
Egils Evalds, 124 Linwood Avenue, Ardmore, Pa.

Filed Dec. 3, 1969, Ser. No. 881,707

Int. Cl. H03k *17/00*

U.S. Cl. 307—252 B **1 Claim**

The present circuit employs the combination of a balanced bridge and a balanced differential amplifier to effect a continuous control of energy being supplied to a heat-generating device. The present circuit, in effecting said continuous control, has the capability of rapidly turning on said heat generating device and rapidly turning off said heat-generating device as well as effecting controls at all of the levels in between. A first electronic switch is coupled to the combination of a balanced bridge and a balanced differential amplifier and is responsive to the output therefrom to in turn trigger a second electronic switch which actually operates to permit energy to be transferred to the heating device. In addition, the present circuit employs a means to generate a substantially square wave input which serves to effect better regulation of the system. Further, the present circuit is designed to electrically isolate the load circuit from the control circuit.



3,648,078

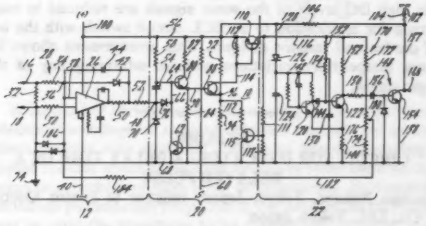
CONTROLLED TIME-RATIO SYSTEM

James H. Galloway, New Baltimore, Mich., assignor to Udylite Corporation, Warren, Mich.

Filed Nov. 20, 1969, Ser. No. 878,487

Int. Cl. H03k *5/00*

U.S. Cl. 307—260 **14 Claims**



A trigger circuit for use in firing either one or a series of silicon controlled rectifiers or other similar devices by means of a plurality of output pulses, the first pulse being generated at the end of the timed firing angle, the system including an input operational amplifier which receives a first direct current input, the input either being preset or derived from an input control amplifier, this direct current level being utilized by the operational amplifier to produce a preselected DC voltage. The output of the operational amplifier is fed to a timing circuit, the output voltage level of the operational amplifier setting the starting point or starting voltage for the timing circuit. When the timing circuit times out, a free-running multivibrator is caused to operate to produce a series of output pulses, which pulses continue until the end of the half-cycle. Also, a signal which has a characteristic dependent on the firing angle at which the circuit operated, is fed back to the input of the operational amplifier such that the amplifier is adjusted in its operation to cause the timing circuit to time out and set the firing angle in accordance with the input signal being fed to the input circuit of the amplifier.

3,648,079

HIGH-SPEED SENSE LATCH CIRCUIT

Richard W. Bryant, Poughkeepsie, and George K. Tu, Wappingers Falls, both of N.Y., assignors to Cogar Corporation, Wappingers Falls, N.Y.

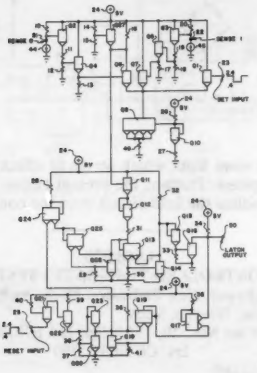
Filed July 10, 1970, Ser. No. 53,780

Int. Cl. H03k *5/20, 3/286*

U.S. Cl. 307—289 **12 Claims**

A sense latch circuit having a short access time. The latch output switches state rapidly due to the incorporation of a

minimum number of logic stages between the sense inputs and the output drive stage, thereby introducing a minimum number of delays. Nonsaturable logic circuits are utilized to allow fast switching. At the inputs of the sense latch circuit,



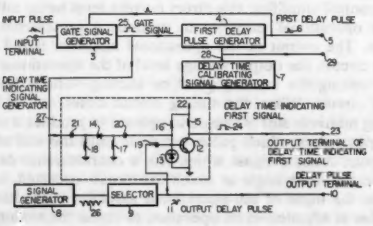
the high DC levels of the sense signals are reduced in magnitude for application to an ECL circuit switch with the use of diodes and resistor dividers. This arrangement allows for large temperature variations without saturating any of the logic stages.

3,648,080

CIRCUIT FOR INDICATING A DELAY TIME OF A DELAYED PULSE

Naohisa Nakaya, Tokyo, Japan, assignor to Iwatsu Electric Co., Ltd., Tokyo, Japan

Filed Aug. 27, 1970, Ser. No. 67,368
Claims priority, application Japan, Aug. 27, 1969, 44/67307
Int. Cl. H03k *17/28*
U.S. Cl. 307—293 **7 Claims**



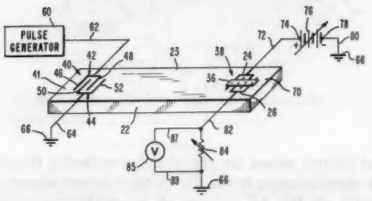
A delay time indicating circuit utilizes a very stable signal generator, for example, a variable frequency crystal controlled oscillator. The above-mentioned signal generator is driven synchronized with an input pulse. The first or an n'th output signal of the above-mentioned signal generator is arbitrarily extracted, thereby a pulse having a predetermined delay time can be obtained. The delay time of the obtained delayed pulse with regard to the input pulse is measured by using a delay time indicating signal generator including one or two flip-flop circuits.

3,648,081

PIEZOELECTRIC ACOUSTIC SURFACE WAVE DEVICE UTILIZING AN AMORPHOUS SEMICONDUCTIVE SENSING MATERIAL

Eric G. Lean, Mahopac; Varadachari Sadagopan, and Samuel C.-C. Tseng, both of Ossining, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1970, Ser. No. 51,187
Int. Cl. H01v *7/00*
U.S. Cl. 310—8.1 **16 Claims**



An integrated acoustic surface wave device is provided by this disclosure wherein a piezoelectric field associated with an acoustic surface wave causes a material adjacent to the surface to transform from one physical state to another physical state. The changes in state due to the presence of the piezoelectric wave are utilized to detect, amplify and store information. The presence of the piezoelectric wave controls external physical quantities, e.g., voltage and current, for information processing and storage. In particular, an amorphous semiconducting material is deposited on the surface of a piezoelectric surface wave acoustic delay line at a location where the presence of the traversing piezoelectric wave is to be detected. Contact electrodes are provided on the amorphous material and are connected to an external electrical circuit wherein there is a voltage source and a load means. The voltage source provides an electric field in the amorphous material of a value below that necessary to achieve the threshold value for switching the material from a high-voltage and low-current state to a high-current and low-voltage state. In this manner, the piezoelectric field of the acoustic surface wave which transiently appears at the amorphous material when added to the externally applied electric field causes it to switch states and thereby gives rise to a pulse indication in the external electrical circuit.

Accordingly, an integrated apparatus in accordance with this disclosure includes a piezoelectric surface wave delay line and an amorphous semiconductor film. A transducer on the surface of the piezoelectric crystal generates piezoelectric surface waves therein, and a local receiving transducer which serves as the electrodes for the amorphous semiconductor film intercepts the piezoelectric surface wave. The electric field associated with the surface wave supplements a bias electric field at the amorphous semiconductor film and causes the states thereof to switch and provides an indication of the presence of the piezoelectric wave in the external electric circuit connected to the amorphous film.

3,648,082

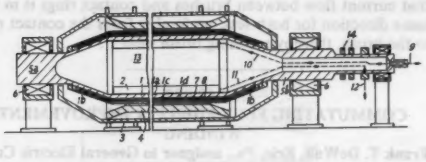
ROTARY ELECTRICAL MACHINES

Robert Beattie MacNab; John Sterry Hawley Ross, and Michael Burke Wood, all of Newcastle upon Tyne, England, assignors to International Research & Development Company Limited, Fossway, Newcastle upon Tyne, England

Filed June 5, 1970, Ser. No. 43,693
Claims priority, application Great Britain, June 10, 1969, 29,436/69
Int. Cl. H02k *9/19*
U.S. Cl. 310—10 **15 Claims**

A synchronous alternating current machine having a superconducting field winding on a hollow cylindrical portion of a

rotor which is joined by hollow frustoconical transition members to supporting stub shafts. The field winding is cooled by cryogenic fluid from a refrigerator, which may be wholly or



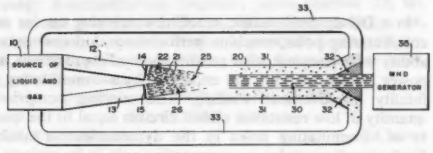
partly within the rotor, and heat leak into the winding is minimized by the hollow transition members, which are themselves cooled, and a radiation shield mounted on the outside of the rotor.

3,648,083

TWO-PHASE FLOW SYSTEM WITH DISCRETE IMPINGING TWO-PHASE JETS

George M. Low, Deputy Administrator of the National Aeronautics and Space Administration with respect to an invention of; David G. Elliott, 5208 North Point Road, La Canada, and Lance G. Hays, 4328 Canyon Crest, Altadena, both of Calif.

Filed Oct. 21, 1970, Ser. No. 82,648
Int. Cl. H02m *4/02*
U.S. Cl. 310—11 **2 Claims**



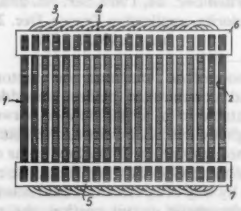
A flow system with discrete two-phase nozzles is disclosed. The two-phase jets produced in the nozzles are caused to impinge one another in a mixing channel, resulting in significant coalescence of the liquid into a stream in the center of the channel, with the gas in the jet being forced to the periphery of the liquid stream.

3,648,084

LINEAR INDUCTION MOTORS

Eric Roberts Laithwaite, Surbiton, and Hugh Robert Bolton, London, both of England, assignors to National Research Development Corporation, London, England

Continuation-in-part of application Ser. No. 753,506, Aug. 19, 1968, now abandoned. This application June 16, 1970, Ser. No. 46,626
Claims priority, application Great Britain, Aug. 31, 1967, 39,933/67
Int. Cl. H02k *41/02*
U.S. Cl. 310—13 **9 Claims**



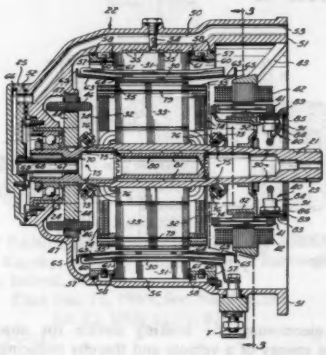
The magnetic field of a linear motor is evenly distributed over the airgap between the primary and secondary members by providing a ladderlike grid structure of conductors at each side, by interleaving the laminations with conductive stampings near the sides, by strips of conductive material on or near the surface of the stator, or by chamfering the edges.

3,648,085

LIQUID COOLING ARRANGEMENT FOR DYNAMOELECTRIC MACHINE

Robert L. Fujii, Cleveland, Ohio, assignor to Lear Siegler, Inc., Santa Monica, Calif.

Filed Mar. 26, 1970, Ser. No. 22,752
Int. Cl. H02k *9/20*
U.S. Cl. 310—54 **12 Claims**



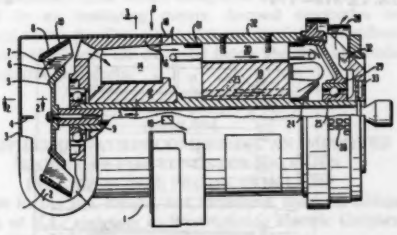
A method of and apparatus for cooling the heat-producing electrical windings of a dynamoelectric machine by spraying them directly with atomized coolant to deposit a coating of liquid coolant which flows over and away from them to carry away heat picked up from them by conduction. Hydraulically atomized particles are projected at low velocity to thoroughly wet or coat the structures to be cooled and to increase the heat transfer to the coolant. The spray nozzles are arranged and their outputs shielded to minimize any insulation erosion that might result from centrifugal motion of coolant and from the low velocity sprays.

3,648,086

STARTER GENERATOR CONSTRUCTION

Charles F. Renner, Erie, Pa., and Norman J. Lipstein, Schenectady, N.Y., assignors to General Electric Company

Filed Aug. 7, 1968, Ser. No. 750,909
Int. Cl. H07k *9/06*
U.S. Cl. 310—63 **6 Claims**



A dynamoelectric machine which is comprised of a stator, a rotor which includes an armature and a commutator, a brush rigging associated with said commutator, and a pair of

fans for directing cooling air through the stator, rotor, and brush rigging. Radial baffles are provided to more effectively cool the commutator area; a combined bearing support and air baffle aids cooling of a bearing which rotatably supports the rotor; and a foam-filled shroud surrounds the tips of the fan blades to increase the effectiveness thereof.

3,648,087

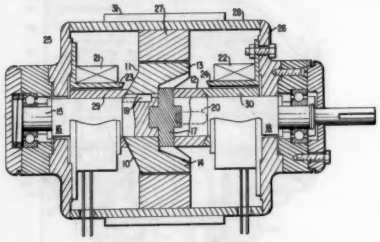
ELECTROMAGNETIC BRAKING DEVICE

Hiroyuki Kitamura, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed July 22, 1970, Ser. No. 57,174

Int. Cl. H02k *49/04*

U.S. Cl. 310—93 **6 Claims**



An electromagnetic braking device for absorbing the running energy of a vehicle and thereby reducing the speed thereof featuring a stator core secured to a stationary portion of the vehicle body, a rotary shaft extending through said stator core and being drivingly connected with the drive shaft of the vehicle, a comb-shaped poled rotor mounted on the rotary shaft for unitary rotation therewith within a bore of the stator core, and exciting coils for generating magnetic fluxes through the pole surfaces of the rotor and the inner surface of the stator core to cause eddy currents to flow on the inner surface of the stator core, whereby the speed of the rotor is retarded.

3,648,088

CURRENT TRANSFER DEVICES FOR ELECTRICAL MACHINES

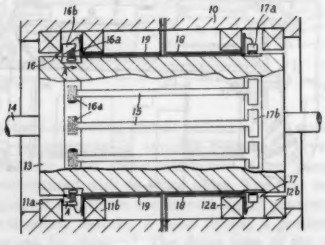
Geoffrey Alan Wilkin; Ian Roderick McNab, and Anthony Derek Appleton, all of Newcastle, England, assignors to International Research & Development Company Limited, Fossway, Newcastle upon Tyne, England

Filed Feb. 5, 1971, Ser. No. 112,876

Claims priority, application Great Britain, Feb. 5, 1970, 5,643/70

Int. Cl. H02k *31/02*

U.S. Cl. 310—178 **6 Claims**



Current transfer system for homopolar machines and other electrical machines having a direct current circuit passing from the stator to the rotor by way of a first brush and contact ring set and back from the rotor to the stator by way of a second brush and contact ring set, in which the brushes are on the stator in one set and on the rotor in the other set so that current flow between brushes and contact rings is in the same direction for both sets, preferably from the contact ring to the brush, thereby reducing brush wear.

3,648,089

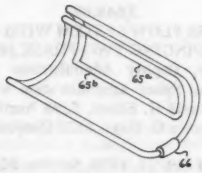
COMMUTATING FLUX FIDELITY IMPROVEMENT WINDING

Frank T. DeWolf, Erie, Pa., assignor to General Electric Company

Filed Apr. 7, 1970, Ser. No. 26,294

Int. Cl. H02k *3/20*

U.S. Cl. 310—186 **1 Claim**



In a DC dynamoelectric machine employing one or more commutating poles, machine performance and commutating ability with transient load conditions, cyclic pulsations in its power supply, or both, are enhanced by a commutating flux fidelity improvement winding. The winding comprises a quantity of low-resistance closed circuits equal to the quantity of commutating poles in the dynamoelectric machine. Each circuit encircles a commutating pole in its entirety and the proximate half of an adjacent main pole. A segment of each circuit is recessed in a face of one of the main poles adjacent a gap between the pole face and parallel to the axis of an armature rotatably supported in the machine. In response to load current changes in coils in the armature, distributed magnetic flux density changes occur at the gap. These flux density changes induce a voltage in the recessed segment, resulting in a current in the circuit. An additive flux is fostered in the commutating pole by this current in the circuit. The additive flux develops earlier than the normal commutating pole transient responsive flux. Since this additive flux occurs in advance of the normal commutating pole transient responsive flux, it is more nearly coincident with the causative transient condition and yields improved commutation in a dynamoelectric machine incorporating the flux fidelity improvement winding of this invention.

3,648,090

DYNAMO-ELECTRIC MACHINE

Robert Voin, 1 rue Charcot, Saint Priest en Jarot, France

Filed Dec. 24, 1969, Ser. No. 888,011

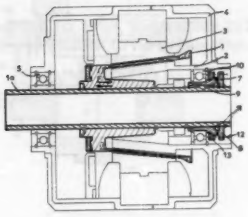
Claims priority, application France, Dec. 26, 1968, 266

Int. Cl. H02k *3/00*

U.S. Cl. 310—191 **23 Claims**

A dynamo-electric machine or motor having rotor windings and commutator blades embedded in insulating material rotatable in an airgap defined between external and internal magnetic circuit portions, the rotor position being adjustable through the use of surface cams or shims and the airgap width being adjustable by shims, the rotor being internally cooled by way of apertures in said rotor and channels in the internal magnetic circuit portion, the rotor being reinforced by filaments binding the rotor conductors and a central, radially deformable, bush, commutator brushes being carried by holders radially slidably mounted on an angularly adjustable support and accessible externally of the motor,

and magnetic field producing elements being at the internal portion of the circuit and/or being provided by a permanent



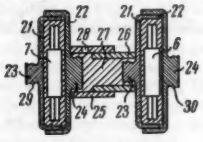
or electromagnetic tubular member with L-shaped pole pieces.

3,648,091

STATOR BAR WINDING OF ELECTRIC MACHINE

Konstantin Fedorovich Kostin, prospekt Lenina 48, kv. 101; Georgy Konstantinovich Sapunov, ulitsa Stachek 25, kv. 95; Alvian Afanasievich Svirin, ulitsa Pervomaiskaya 44, kv. 5; Valery Ivanovich Strakhov, prospekt Lenina 48, kv. 40, and Grigory Iosifovich Shur, ulitsa Krosnoflottser 7, kv. II, all of Sverdlovsk, U.S.S.R.

Filed June 11, 1970, Ser. No. 45,351
Int. Cl. H02k 3/46
U.S. Cl. 310—260 8 Claims



A stator bar winding for an electric machine in which the heads of end connections of the winding are insulated by means of cups and cavities between the heads and the cups are filled with an insulating compound. Between adjacent cups, there are provided spacers secured against displacements at least on one side, by supports on the lateral surface of said cups. The spacers may be made in the form of wedges and inserts.

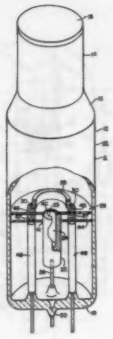
3,648,092

ARSENIC-ANTIMONY-BISMUTH HOLLOW CATHODE LAMP

James E. Wooldridge, Elmira Heights, and George K. Yamasaki, Horseheads, both of N.Y., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 13, 1970, Ser. No. 27,697
Int. Cl. H01j 61/04
U.S. Cl. 313—209 4 Claims

A radiation source of the hollow cathode variety capable of emission of spectral radiation characteristic of the elements arsenic, antimony and bismuth.

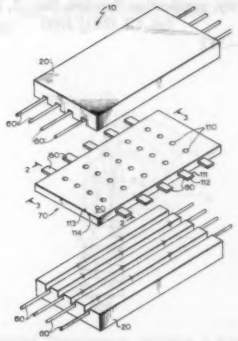


3,648,093

DISPLAY PANEL WITH NOVEL CATHODE ASSEMBLY

George A. Kupsky, Milford, N.J., assignor to Burroughs Corporation, Detroit, Mich.

Filed Dec. 11, 1969, Ser. No. 884,185
Int. Cl. H01j 61/06, 61/30
U.S. Cl. 313—217 8 Claims



The display panel comprises first and second layers of communicating gas-filled cells having a common electrode system between them which comprises first electrodes supported in an insulating matrix. Second electrodes are disposed above the first electrodes and insulated therefrom, and third electrodes are disposed below the first electrodes and insulated therefrom.

3,648,094

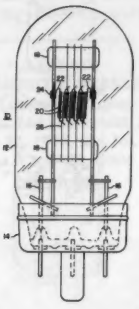
LAMP COMBINATION COMPRISING AN IMPROVED ENVELOPE FOR TUNGSTEN-HALOGEN INCANDESCIBLE PROJECTION LAMP

Aristide R. DeCaro, Edison, and Nicholas J. Rainone, Clifton, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 15, 1970, Ser. No. 28,663
Int. Cl. H01k 1/50
U.S. Cl. 313—221 8 Claims

An incandescible projection lamp combination which utilizes a vitreous borosilicate glass, light transmitting envelope.

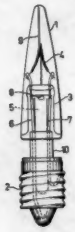
The lamp utilizes a tungsten filament and a bromine containing atmosphere. The power loading is about 13.6 to 16.4 watts per cubic centimeter of lamp volume, whereby light output is essentially constant throughout life.



3,648,095
ELECTRIC INCANDESCENT LAMP SIMULATING A CANDLE FLAME

Bengt Erling Beckman, Alstensgatan 90, Bromma, Sweden

Filed Dec. 1, 1969, Ser. No. 881,132
Claims priority, application Sweden, Dec. 3, 1968, 16521/68
Int. Cl. H01j 5/00
U.S. Cl. 313—317 6 Claims



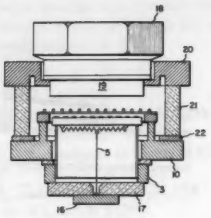
An electric incandescent lamp having a filament, a glass flare, a bulb, a base, a pumping stem for evacuating the bulb during manufacture and electrical conductors connecting the base and the filament. The base is connected to the pumping stem, which thus connects the base with the bulb which is located at a distance therefrom.

3,648,096
ELECTRON BEAM FOCUSING BIPOTENTIAL CATHODE

James E. Beggs, Schenectady, N.Y., assignor to General Electric Company

Filed Sept. 26, 1968, Ser. No. 762,797
Int. Cl. H01j 1/20, 1/46, 1/52
U.S. Cl. 313—346 R 5 Claims

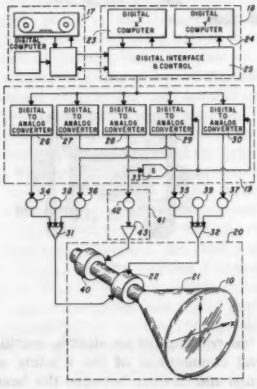
To increase selectively the electron emission from a cathode, a control grid is placed above the cathode and osmium or iridium is evaporated through the openings of the grid onto the cathode. On the resulting cathode the coated regions provide a value of work function which is lower than that of the uncoated regions.



3,648,097
DIGITAL CATHODE-RAY TUBE LINEARITY CORRECTOR

Jerry Dale Merryman, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 1, 1969, Ser. No. 881,251
Int. Cl. H01j 29/46
U.S. Cl. 315—24 10 Claims



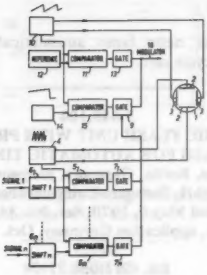
A system for correcting the signals transmitted to the deflection yokes of a cathode-ray tube employs digital means to produce an undistorted linear display while requiring a minimum of adjustments. Basically, the system utilizes digital circuitry to produce a correction factor from digital X- and Y-coordinate data supplied by a digital computer. This correction factor, which is equivalent to the sum of the squares of the X- and Y-coordinate data, is converted into an analog signal, along with the coordinate data, by digital to analog converters. The analog correction signal is multiplied by and then added to the analog coordinate signals, thereby producing the corrected deflection signals for an undistorted linear display on the essentially flat face of the tube. An analog correction signal may also be utilized to correct the focus of the electron beam on the tube face.

3,648,098

OSCILLOSCOPES UTILIZING VIDEO SIGNALS TO MODULATE THE BEAM WITH VARYING DEFLECTION PERIODS

David Godwin Talbert, London, England, assignor to S.E. Laboratories (Holdings) Limited, Feltham, Middlesex, England

Filed Oct. 10, 1969, Ser. No. 865,252
Claims priority, application Great Britain, Oct. 11, 1968, 48,373/68
Int. Cl. H01j 29/70
U.S. Cl. 315—26 6 Claims



An oscilloscope is disclosed which includes means for producing deflection of the beam of a cathode-ray tube in one direction at a relatively high frequency and deflection in another direction at a lower frequency, means for gating video signals to modulate said beam during a short interval in each of a series of lower frequency deflection periods, the timing of said short intervals being changed in successive periods so that the waveform of said video signals is displayed. There is also disclosed as a further feature means for gating signals to form one or more markers on the display during respective selected high-frequency deflection periods in each lower frequency deflection period.

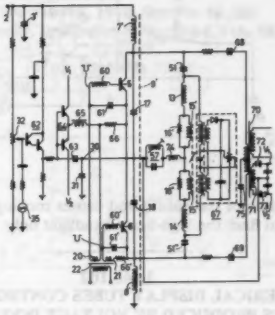
3,648,099

CIRCUIT ARRANGEMENT IN A DISPLAY DEVICE FOR PRODUCING A LINE-FREQUENCY SAWTOOTH CURRENT HAVING AN AMPLITUDE WHICH VARIES AT THE FRAME FREQUENCY

Walter Otten, Hamburg, Germany; Gosse Jan Postma; Jan Joost Rietveld, both of Emmasingel, Eindhoven, Netherlands, and Jorg Wolber, Hamburg, Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 5, 1969, Ser. No. 855,685
Claims priority, application Germany, July 8, 1969, P 19 34 568.7
Int. Cl. H01j 29/70
U.S. Cl. 315—27 GD 13 Claims

A color TV display system with a circuit for generating in the line deflection coil halves a line-frequency sawtooth correction current whose amplitude varies at the frame frequency. The line deflection current in the line deflection coil halves is supplied by two line generators which are connected in series for direct current across the terminals of a supply source of DC voltage. The junction point of the generators is decoupled for line-frequency signals. A direct voltage which is substantially one-half of the supply voltage and a sawtooth



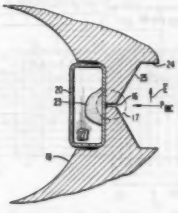
modulation voltage at the frame frequency are both applied to the junction point.

3,648,100

ELECTRODELESS PULSED ILLUMINATOR

Harry Goldie, Randallstown; Michael A. Goldman, Pikesville, both of Md., and Gerald I. Klein, Westbury, N.Y., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 24, 1969, Ser. No. 809,671
Int. Cl. H01j 7/46, 19/80
U.S. Cl. 315—39 3 Claims



A gaseous pulsed illuminator utilizing a halogen gas. No electrodes are required to strike the discharge and accordingly highly reactive gases having short luminous decay times may be employed. The excitation power is a radiofrequency source coupled through a waveguide or other RF transmission line.

3,648,101

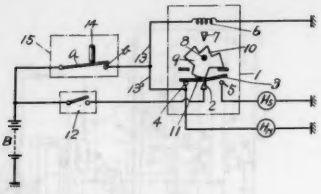
PASSING SIGNALS FOR AUTOMOBILES

Masaru Suzuki, Aichi-ken, Japan, assignor to Kabushiki-Kaisha Tokai Denki Seisakushe, Aichi-ken, Japan

Filed Jan. 12, 1970, Ser. No. 2,003
Claims priority, application Japan, Jan. 24, 1969, 44/6229; Jan. 25, 1969, 44/6540
Int. Cl. B60g 1/46
U.S. Cl. 315—82 6 Claims

The usual high-beam and low-beam headlights of an automotive vehicle are wired in circuit to be controlled by a pulsing rod to effect flash signals. At night a main switch is closed to illuminate both high-beam and low-beam headlights and to incorporate them in a pulsing circuit controlled by the reciprocable pulsing rod and a rocker member to flash the

lights off and on by reciprocation of the rod. During the day the main switch is opened but through a branch circuit,



reciprocation of the pulsing rod causes rocking of the rocker member to flash the high-beam headlight only.

3,648,102

NUMERICAL DISPLAY TUBES CONTROLLED BY PULSES PRODUCED BY VOLTAGE INVERTER AND DIRECTED BY SWITCH DEVICE TO EACH TUBE IN SUCCESSION

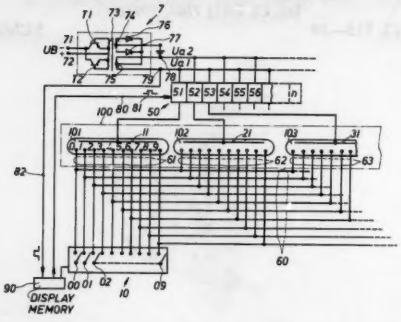
Hubertus Bettin, Braunschweig, Germany, assignor to Olympia Werke AG, Wilhelmshaven, Germany

Filed Aug. 19, 1970, Ser. No. 64,944

Claims priority, application Germany, Aug. 19, 1969, P 19 42 060.1

Int. Cl. H05b *41/30*

U.S. Cl. 315—133 **7 Claims**



A circuit arrangement for controlling the operation of numerical display glow tubes and including means for producing a train of pulses of sufficient voltage to operate such tubes and switching means connected between the voltage pulse producing means and the tubes for applying the pulses directly to each tube in succession and also causing the pulses to directly control the switching operations of the switching means.

3,648,103

DEVICE FOR INDICATING INTERRUPTION OF ELECTRICAL SERVICE

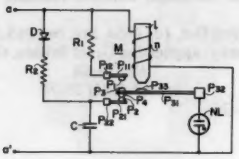
Takaaki Okada, Ageo, Japan, assignor to Kabushiki Kaisha Koparu

Filed Apr. 6, 1970, Ser. No. 25,626

Int. Cl. G08b *21/00*

U.S. Cl. 315—136 **6 Claims**

A diode, a resistor, and a capacitor are connected in series between power input terminals, and a neon lamp is connected in parallel with said capacitor through contact points controlled by an electromagnetic relay. Using such an arrangement, upon the resumption of electrical service after its



interruption, the neon lamp automatically flickers at a predetermined cycle rate.

3,648,104

ELECTRONIC FLASH UNIT WITH PRELIMINARY FLASH FOR AUTOMATIC TIMING

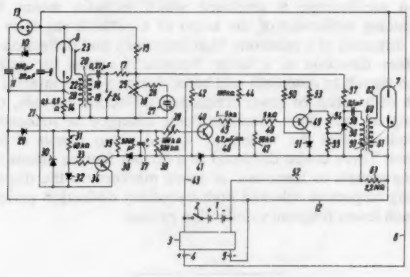
Karl Ackermann, Berlin, Germany, assignor to Robert Bosch Photokino GmbH, Stuttgart-Untertuerkheim, Germany

Filed May 5, 1970, Ser. No. 34,685

Claims priority, application Germany, Oct. 3, 1969, P 19 49 967.3

Int. Cl. H05b *31/04*

U.S. Cl. 315—151 **21 Claims**



The main flash of the flash unit is initiated immediately after a preliminary flash. A photoelectric element receives the light reflected from the subject during the preliminary flash. The electrical signal corresponding to the light received is integrated and the main flash terminated after a delay depending upon the integrated signal.

3,648,105

SINGLE-CONDUCTOR ARRANGEMENT FOR POWERING AND TRIGGERING FLASHLAMPS

Douglas C. Sanford, Princeton Township, Mille Lacs, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

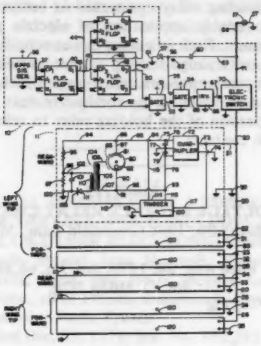
Filed Sept. 9, 1969, Ser. No. 856,435

Int. Cl. H05b *41/34*

U.S. Cl. 315—237 **9 Claims**

A circuit for energizing all the flashing lights of an aircraft recognition light system on a single wire from a central controller even though the lights do not all flash at the same time: at the central controller the AC for the lights is broken

up into blocks or bursts spaced by one-fifth their own duration, all the blocks being transmitted on the single wire to all

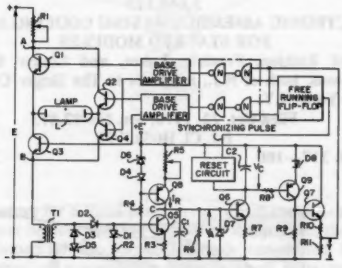


the light units, and the lights being flashed selectively at the beginnings or the endings of the blocks.

3,648,106
DYNAMIC REACTORLESS HIGH-FREQUENCY VAPOR LAMP BALLAST

Joseph C. Engel, and Robert T. Elms, both of Monroeville, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 24, 1970, Ser. No. 13,661
Int. Cl. H05b 37/02, 41/30
U.S. Cl. 315—291 **15 Claims**

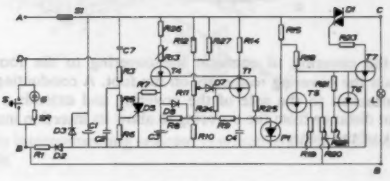


A control device and method of operation for a discharge lamp which would under normal operation display a runaway discharge characteristic. The control device constitutes a part of a low-impedance power supply which is without any effective current limiting impedance, and is thus a high-efficiency device. A high-frequency discharge sustaining potential is applied across the discharge lamp at a repetition rate of at least about 500 times per second. A feedback control signal is generated based on a predetermined lamp operating condition, and this feedback signal is used to control the duty cycle of operation, with each period of potential application not exceeding about 1.8 milliseconds, and with the duty cycle always being less than unity. The repetition rate of potential application may be simultaneously varied with the duty cycle of a feedback signal so that a particular discharge lamp operates at an optimum repetition rate.

3,648,107
CIRCUITRY FOR CONNECTING AND DISCONNECTING A LOAD

Sten-Ake Olaus Rydborn, Kvarngatan 7, 34300 Almhult, Sweden

Filed Feb. 10, 1970, Ser. No. 10,186
Claims priority, application Switzerland, Feb. 18, 1969, 2208/69
Int. Cl. H05b 37/02
U.S. Cl. 315—360 **4 Claims**

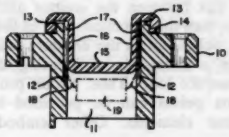


Electronic circuitry for a so-called automatic staircase time switch for lighting and extinguishing several parallel-connected incandescent lamps, wherein a blocking circuit responding to a predetermined ambient light intensity is blocking actuation of a switch circuit by a manually operable lighting circuit and an extinguishing circuit automatically disconnects the lamps from their current source after a predetermined connecting period.

3,648,108
MOLDED SHUNTS FOR INTEGRATED CIRCUITS

Richard J. Bailey, Tonawanda, N.Y., assignor to GTI Corporation

Filed Jan. 27, 1971, Ser. No. 110,143
Int. Cl. H05f 3/00
U.S. Cl. 317—2 R **5 Claims**



A carrier and conductive shunt structure for preventing static discharge from external sources which would cause damage to the integrated circuit package in the form of a nonconductive carrier having a well adapted to receive an integrated circuit with grooves in the sidewall of the well corresponding to the leads of the integrated circuit and a flange surrounding the well opening, a shunt of conductive plastic having a base generally in the shape of the integrated circuit with upstanding sidewalls having ridges corresponding to the grooves of the well of the carrier and resiliently fitting therein and bearing on the leads of the integrated circuit and channel means on the top of the shunt sidewalls engaging the flange of the carrier in locking arrangement.

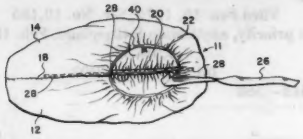
3,648,109
SANITARY SHOE COVER

Jerry L. Tims, and Vance M. Hubbard, both of Euless, Tex., assignors to Precept, Incorporated, Euless, Tarrant County, Tex.

Filed Feb. 10, 1971, Ser. No. 114,260
Int. Cl. A61n 1/14
U.S. Cl. 317—2 B **3 Claims**

A sanitary and protective covering for shoes constructed from foldable material with its edges attached together to

form a covering. An opening is provided in the covering for the leg of the wearer and an elastic band is attached around the periphery of the opening to close the opening around the leg. A second elastic band is attached to the seam in the sole



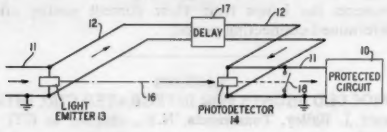
of the covering to conform the covering to the foot and retain the covering resiliently on the foot. A conducting tape is attached to the sole of the covering and extends a sufficient distance from the covering to allow its insertion into the sock of the wearer.

3,648,110

CIRCUIT PROTECTION APPARATUS UTILIZING OPTICAL TRANSMISSION PATH

Stephen Knight, Murray Hill, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 20, 1970, Ser. No. 65,579
Int. Cl. H02h *3/22*
U.S. Cl. 317—16 **5 Claims**



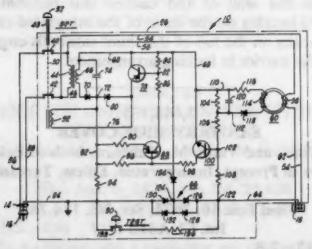
High-speed circuit protection from high-current pulses is obtained by providing a transmission line loop that includes a light emitter and photodetector at opposite ends of the loop. The optical link between the emitter and photodetector is much shorter than the electrical path of the loop. A spurious high-current pulse excites the emitter, causing the photodetector to arm a dissipating or shunting element before the pulse traverses the loop. Thus, circuit protection from very high-rise time pulses can be provided by relatively low-response time elements. Other embodiments are also described.

3,648,111

DEVICE FOR SENSING OVERCURRENT AND GROUND LEAKAGE CURRENT

Guy E. Howe, 200 North Main, Tonkawa, Okla.

Filed Dec. 17, 1970, Ser. No. 99,037
Int. Cl. H02h *3/14, 3/08*
U.S. Cl. 317—18 A **7 Claims**



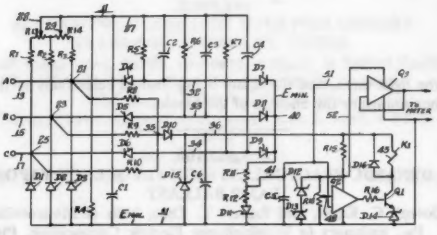
Apparatus for connection in series with power equipment and a grounded AC power source which enables sensing of ground lead leakage current and excess power consumption to open the power application circuit and avoid damaging conditions and effects to the power equipment and/or operator. The apparatus consists of a momentary pushbutton switch and holding relay connected in series with the AC powerline to enable application of electric power to the power equipment. Both an excess power-sensing circuit and a ground current leakage-sensing circuit provide input to a normally nonconductive reactance stage which, in the event of sense input, is biased to the conductive state thereby to effect deenergization of the holding relay to release the pushbutton switch contacts.

3,648,112

VOLTAGE BALANCE RELAY CIRCUIT

Robert W. Beckwith, 1002 Greenfield Lane, Mount Prospect, Ill.

Filed Aug. 24, 1970, Ser. No. 66,486
Int. Cl. H02h *3/26*
U.S. Cl. 317—27 R **4 Claims**



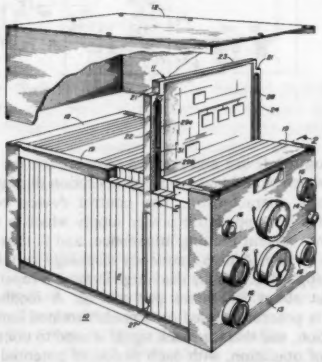
A protective circuit for an electric polyphase system for indicating conditions of voltage unbalance between the phases, and for actuating a relay in response thereto.

3,648,113

ELECTRONIC ASSEMBLY HAVING COOLING MEANS FOR STACKED MODULES

J. Fred Rathjen, Franklin Lakes, and Lothar Laermer, Paramus, both of N.J., assignors to The Singer Company, New York, N.Y.

Filed Oct. 22, 1970, Ser. No. 82,873
Int. Cl. H05k *7/20*
U.S. Cl. 317—100 **7 Claims**



A modular electronic system includes a plurality of stacked electronic units. The stacked units have a first cavity therethrough along one edge thereof, and a second cavity therethrough along an opposite edge thereof. Each of the

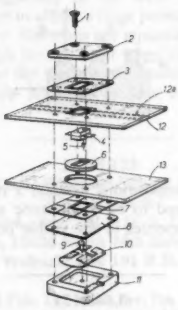
units has a spacing joining the two cavities. A first mounting plate has an orifice therethrough for communicating with the first cavity, and a second mounting plate has an orifice therethrough for communicating with the second cavity. Means are provided for clamping the fist mounting plate, the stacked units, and the second mounting plate together, so that cooling fluid can be passed from an exterior source through the first mounting plate orifice, through the first cavity, through in parallel all of the spacings, through the second cavity, and exiting through the second mounting plate orifice.

3,648,114

STRUCTURAL ASSEMBLY FOR A THREE-PLATE CIRCUIT OR THE LIKE WHICH INCLUDES AT LEAST ONE DIODE OR OTHER ELECTRONIC COMPONENT

Bertrand Claude Marcel Jean Manuali, Villiers-sur-Orge; Robert Doullet, Paris, and Denis Jacques Laedlein, Villennes-sur-Seine, all of France, assignors to Centre National D'Etudes Spatiales, Paris, France

Filed Dec. 29, 1970, Ser. No. 102,291
Claims priority, application France, Jan. 15, 1970, 7001438
Int. Cl. H05k 1/04
U.S. Cl. 317—101 CP **5 Claims**



A structure for a three-plate circuit which includes a diode which must be connected to ground by a capacitor, the latter being formed of two capacities each constituted by the metallization of a supporting plate, a small plate made of Mylar and a metal plate.

Application to structure in which the diodes are easily removable.

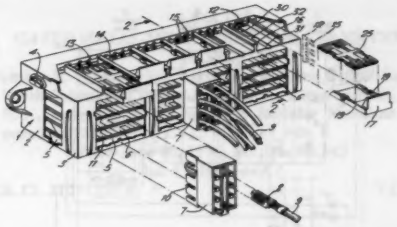
3,648,115

FUSE UNIT HAVING SLIDABLE FUSE-RECEIVING DRAWER

Wladimiro Teagno, Turin, Italy, assignor to AMP Incorporated, Harrisburg, Pa.

Filed Sept. 4, 1970, Ser. No. 69,697
Claims priority, application Italy, Oct. 17, 1969, 23520 A/69
Int. Cl. H05k 5/02, 5/04
U.S. Cl. 317—101 DH **6 Claims**

A wiring junction block comprising a stack of printed circuit boards mounted in generally parallel spaced relationship in a frame, edge portions of the boards being exposed at an aperture in the frame for receiving a connector having a plurality of individual edge contacts for engaging respective conductive strips of the different circuit boards at the exposed edges. Conductors are arranged transversely of the circuit



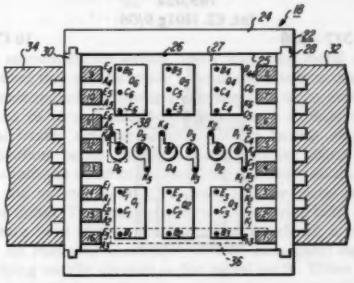
boards interconnecting selected conductive strips of different boards.

3,648,116

MULTICIRCUIT HYBRID MODULE AND METHOD FOR MAKING

Dale Milton Baugher, Flemington, and Earl Thomas Hausman, Somerset, both of N.J., assignors to RCA Corporation

Filed Sept. 17, 1970, Ser. No. 72,943
Int. Cl. H02b 1/04, 9/00
U.S. Cl. 317—101 A **5 Claims**



Disclosed is a hybrid circuit module in a package having a mounting surface. A plurality of circuit elements capable of a number of circuit configurations are disposed on the mounting surface. External termination is provided by a flat metal plate having terminal fingers extending through the package. Connecting means within the package are connected between the circuit elements and the fingers; the connecting means are common to all of the different circuit configurations. The flat plate is sheared to isolate some of the fingers and define only one of the circuit configurations.

3,648,117

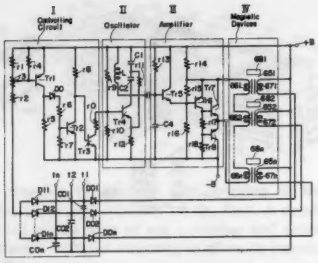
MAGNETIC DEVICE

Mititake Yamamoto, Kyoto; Genzo Uekusa, Takatsuki; Shigeru Tanimura, Kyoto, and Norio Maejima, Kameoka, all of Japan, assignors to Omron Tatusi Electronics Co., Kyoto, Japan

Filed Mar. 5, 1970, Ser. No. 16,752
Int. Cl. H01h 47/22
U.S. Cl. 317—156 **16 Claims**

Transmission of electric signals from a primary coil to a secondary coil can be effectively controlled by moving a magnet to and from a magnetic core of ferromagnetic substance, such as iron, or a ferrimagnetic substance, such as

ferrite. Similar control is obtainable by changing the DC control current in a third coil wound on the magnetic core. By utilizing the above-mentioned controls, various electric



devices, for instance, a keyboard switch without contacts suitable for an electronic calculator, a variable inductor, a vibration-free AC relay, etc. can be made.

3,648,118

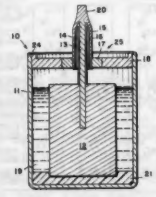
ELECTROLYTIC CAPACITOR HAVING A SEAL INCLUDING A HOLLOW PROJECTING TERMINAL

Paul J. Christiansen, and Robert F. Wallace, both of Indianapolis, Ind., assignors to P. R. Mallory & Co. Inc., Indianapolis, Ind.

Continuation of application Ser. No. 469,109, July 2, 1965, now abandoned. This application Dec. 9, 1968, Ser. No. 785,022

Int. Cl. H01g *9/06*

U.S. Cl. 317—230 10 Claims



In an electrolytic capacitor, an electrolyte substantially covering a porous film-forming metal anode, a film-forming metal anode riser connected to the anode, a dielectric oxide film formed on the anode and on the anode riser and a sealing means. The sealing means includes an apertured metal body, means substantially closing the aperture, a tube of film-forming metal projecting through the means closing the aperture and a dielectric oxide film formed on at least the inner surface of the tube. The anode riser projects into the tube and the tube is closed so that a selected portion of the inner wall of the tube engages with the anode riser. The remaining inner portion of the wall of the tube is spaced from the anode riser.

3,648,119

SOLID-STATE DEVICES FOR PERFORMING SWITCHING FUNCTIONS AND INCLUDING SUCH DEVICES HAVING BISTABLE CHARACTERISTICS

Philippe F. Van Eeck, 11827 Kearsarge Street, Los Angeles, Calif.

Continuation-in-part of application Ser. No. 657,304, July 31, 1967, which is a continuation-in-part of application Ser. No. 453,089, May 4, 1965. This application Sept. 22, 1969, Ser. No. 859,618

Int. Cl. H01g *9/00*

U.S. Cl. 317—232 16 Claims

A family of solid-state current limiters and other solid-state devices comprising a plurality of oriented unbalanced dipoles taken from two groups of conductive particles and encapsulated within a hardened dielectric matrix. One group of conductive particles is selected from the group of elements having an even number of electrons in its outer shell and having

a magnetic moment. The other group of conductive particles is selected from the group of elements having an odd number of electrons in its outer shell and includes those oxides and sulfides of those metals having an odd number of outer shell electrons in their molecular combination.

3,648,120

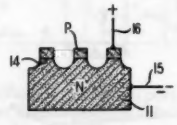
INDIUM ALUMINUM PHOSPHIDE AND ELECTROLUMINESCENT DEVICE USING SAME

Basil W. Hakki, Summit, N.J., assignor to Bell Telephone Laboratories Incorporated, Murray Hill, N.J.

Filed Jan. 16, 1969, Ser. No. 791,575

Int. Cl. H01l *15/00*

U.S. Cl. 317—235 N 3 Claims



$(In_{(1-x)}Al_x)P$ compositions wherein x ranges from 0.2 to 0.5 have been found to be amphoteric and manifest electroluminescent properties in the visible portion of the spectrum.

3,648,121

LAMINATED SEMICONDUCTOR STRUCTURE

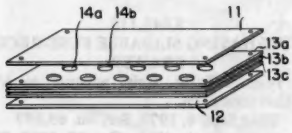
Masanobu Suenaga; Tetsuo Machii, both of Yokohama-shi; Takahiro Sawano, Tokyo; Takehiko Kobayashi, Kawasaki-shi; Tadao Dengo, Yokohama-shi, and Tetsuzo Nakai, Kawaguchi-shi, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan

Filed July 3, 1968, Ser. No. 742,292

Claims priority, application Japan, Sept. 6, 1967, 42/56768; Sept. 27, 1967, 42/61666; Feb. 14, 1968, 43/8836

Int. Cl. H01l *1/02*

U.S. Cl. 317—234 E 10 Claims



A semiconductor apparatus comprising a first and a second electrode substrate arranged substantially in parallel to each other, a semiconductor element containing a plurality of electrode members located between and opposite to the first and second electrode substrates, a layer of organic adhesive material inserted between the first and second electrode substrates for their integral bonding, and a means for connecting

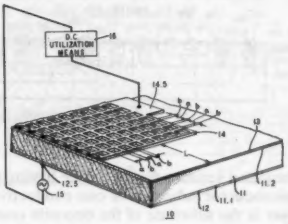
the first and second electrode substrates with the aforesaid plurality of electrode members mechanically as well as electrically.

3,648,122

METAL-INSULATOR-METAL SOLID-STATE RECTIFIER

Carl Neil Berglund, Plainfield, and Edward Haig Nicollian, Murray Hill, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 19, 1970, Ser. No. 47,739
Int. Cl. H01l *19/00*
U.S. Cl. 317—234 **7 Claims**



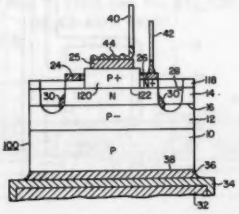
A metal-insulator-metal layered structure is disclosed which is useful as a rectifier of AC voltage. One of the metal layers is advantageously in the form of a crossgrid-type geometry, in order to afford a large perimeter of contact with the insulator layer. Electrons are injected at the edges of the metal grid through the insulator when the grid goes electrically negative, but not when it goes positive; thereby, rectifying properties are afforded by this metal-insulator-metal structure.

3,648,123

EPITAXIAL BASE HIGH-SPEED PNP POWER TRANSISTOR

Frederick G. Ernick, Box 288 R.D. 2, Latrobe, Pa.; Thorndike C. T. New, 11020 North 74th Street, Scottsdale, Ariz., and Donald A. Walczak, Box 191 R.D. 2, New Alexandria, Pa.

Filed Feb. 19, 1970, Ser. No. 12,712
Int. Cl. H01l *9/12, 11/06*
U.S. Cl. 317—235 R **5 Claims**



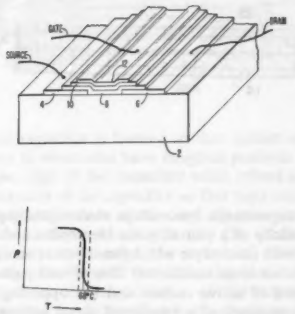
An improved high-speed PNP power transistor, either planar or mesa, comprises at least two epitaxial layers, on a low-resistivity P-type substrate, a first epitaxial layer on the substrate being P-, to provide a collector, and a second epitaxial layer is N-type to provide a base and has an N+ surface layer not exceeding about 1 micron in thickness and of a resistance of about 0.01 ohm-cm., to provide for low saturation, and a P-type emitter laterally contacting or abutting the low-saturation layer, the P-type emitter being either an epitaxially deposited layer to provide a mesa configuration or produced by diffusion through the second epitaxial layer entirely through the saturation surface, in either case to provide a base width of between 1.2 to 4.5 microns.

3,648,124

GATED METAL-SEMICONDUCTOR TRANSITION DEVICE

Webster E. Howard, Jr., Yorktown Heights; Rudolf Ludeke, South Salem, and Phillip J. Stiles, Yorktown Heights, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 10, 1970, Ser. No. 45,143
Int. Cl. H01l *11/14*
U.S. Cl. 317—235 R **7 Claims**



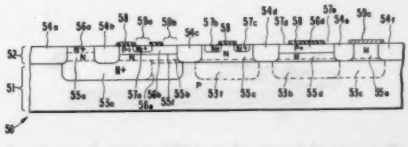
A semiconductor switch, using transition metal oxides, is provided that can be made to undergo a very sudden metal-to-semiconductor transition as a function of an electric field instead of as a function of temperature. Certain transition metal oxides act like semiconductors having valence and conduction bands. When enough mobile charge carriers move into the conduction band, the gap between the conduction and valence band disappears and the metal oxide acts like a metal. The metal oxide, which is being held at a temperature very close to its transition threshold, is employed with an insulated electrode (serving as a gate) capable of supplying mobile carriers to the metal oxide. When a proper bias is applied to the gate electrode, the metal oxide is switched into its high-conduction (metal) state, allowing the flow of current therethrough.

3,648,125

METHOD OF FABRICATING INTEGRATED CIRCUITS WITH OXIDIZED ISOLATION AND THE RESULTING STRUCTURE

Douglas L. Peltzer, Cupertino, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Feb. 2, 1971, Ser. No. 111,956
Int. Cl. H01l *19/00*
U.S. Cl. 317—235 **24 Claims**



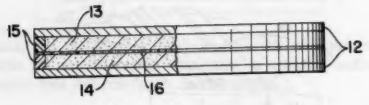
A thin silicon epitaxial layer, formed on a silicon substrate, is subdivided into electrically isolated pockets by a grid of oxidized regions of epitaxial silicon material which extend

through the epitaxial layer to a laterally extending PN junction.

3,648,126
ELECTRICAL CAPACITOR EMPLOYING PASTE ELECTRODES

Donald L. Boos, Garfield Heights, and Joseph E. Metcalfe, III, Bedford, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Dec. 28, 1970, Ser. No. 101,834
Int. Cl. H01g 9/04
U.S. Cl. 317—230 10 Claims

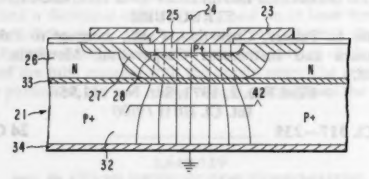


A high capacitance low voltage electrolytic capacitor consists essentially of a pair of paste electrodes and a separator saturated with electrolyte which functions as an electronic insulator and an ionic conductor. One of said paste electrodes is composed of active carbon and the opposing paste electrode is composed of a powdered metal selected from the group consisting of copper, nickel, cadmium, zinc, iron, manganese, lead, magnesium, titanium, silver, cobalt, indium, selenium and tellurium, said electrodes being prepared by mixing finely divided particulate material of the above electrode materials with electrolyte to form a viscous paste and compressing the paste to form the electrodes.

3,648,127
REACH THROUGH OR PUNCH—THROUGH BREAKDOWN FOR GATE PROTECTION IN MOS DEVICES

Martin Lenzlinger, Palo Alto, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Sept. 28, 1970, Ser. No. 76,057
Int. Cl. H01l 11/06
U.S. Cl. 317—235 5 Claims

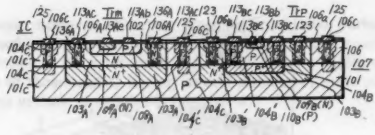


The gate dielectric of an MOS device is protected from voltage surges by forming a PN-junction in parallel with the gate between the voltage source and ground, and directly above a region of highly conductive semiconductor material.

3,648,128
AN INTEGRATED COMPLEMENTARY TRANSISTOR CIRCUIT CHIP WITH POLYCRYSTALLINE CONTACT TO BURIED COLLECTOR REGIONS

Isamu Kobayashi, Kanagawa-ken, Japan, assignor to Sony Corporation, Tokyo, Japan

Continuation-in-part of application Ser. No. 774,702, Nov. 12, 1968, Continuation-in-part of application Ser. No. 774,703, Nov. 12, 1968. This application May 21, 1969, Ser. No. 826,437
Claims priority, application Japan, May 25, 1968, 43/35385
Int. Cl. H01l 19/00, 11/00
U.S. Cl. 317—235 R 3 Claims

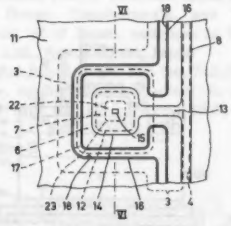


An integrated semiconductor device having a monocrystalline semiconductor substrate of one conductivity type, a diffused layer in the substrate of the opposite conductivity type, a vapor deposited layer formed on the substrate, the vapor deposited layer including a monocrystalline region, and a polycrystalline region of high-impurity concentration surrounding the monocrystalline region and extending from the diffused layer to the surface of the vapor deposited layer, a second monocrystalline region surrounding the polycrystalline region, and monocrystalline regions of high-impurity concentration contiguous to both sides of the polycrystalline region, the monocrystalline regions of high-impurity concentration having the same conductivity type as that of the polycrystalline region and forming a PN junction with the adjoining monocrystalline region.

3,648,129
INSULATED GATE FIELD EFFECT TRANSISTOR WITH INTEGRATED SAFETY DIODE

Rijkent Jan Nienhuis, Nijmegen, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 23, 1969, Ser. No. 818,664
Claims priority, application Netherlands, Mar. 1, 1969, 6903231
Int. Cl. H01l 11/14, 5/06
U.S. Cl. 317—235 R 4 Claims



An insulated gate field effect transistor with an integrated safety diode is described. The safety diode comprises opposite-type conductivity diode zones forming a low breakdown voltage PN-junction by reason of high dopant concentrations in the diode zones. The diode zone which is of the same type conductivity as the substrate completely surrounds the other diode zone and can thus serve as a channel interrupter preventing parasitic transistor action between the safety diode and the active zones of the field effect transistor. Other features include location of the diode zone of the same

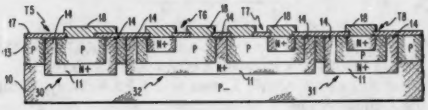
type conductivity as the substrate contiguous with the source electrode, and a metal layer on the surface short circuiting the PN-junction therebetween to directly connect the source to one of the zones of the safety diode.

3,648,130

COMMON EMITTER TRANSISTOR INTEGRATED CIRCUIT STRUCTURE

Paul P. Castrucci, Poughkeepsie; Edward G. Grochowski, Wappingers Falls; William D. North, Poughkeepsie, and Thomas L. Palfi, Yorktown Heights, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed July 16, 1969, Ser. No. 842,195
Int. Cl. H01l *19/00*
U.S. Cl. 317—235 R **4 Claims**



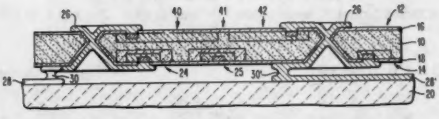
A planar integrated semiconductor circuit having common emitter transistor elements isolated from each other and from other transistors by the emitter regions which form a PN- or rectifying junction with the body of the semiconductor member in which the integrated circuit is formed. In a semiconductor member or body of one type conductivity, a plurality of emitter regions of opposite type conductivity extend from one planar surface of the body. One or more of the emitter regions each have a plurality of discrete base regions of the one type conductivity extending from said planar surface fully enclosed within the emitter region. Each of the base regions in turn has at least one collector region enclosed within it at the planar surface. The emitter region has a higher majority carrier concentration than the majority carrier concentration within its enclosed base regions. The rectifying junction formed by the opposite conductivity emitter region with the one type conductivity semiconductor body serves to isolate the emitter regions from each other.

3,648,131

HOURGLASS-SHAPED CONDUCTIVE CONNECTION THROUGH SEMICONDUCTOR STRUCTURES

Kenneth P. Stuby, Wappingers Falls, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 7, 1969, Ser. No. 874,729
Int. Cl. H01l *19/00*
U.S. Cl. 317—235 R **7 Claims**



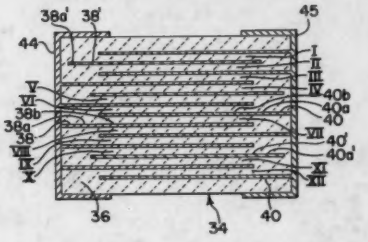
An integrated semiconductor structure including the fabrication thereof, and more particularly, an improved means for interconnecting the two planar surfaces of a semiconductor wafer. To provide the electrically conductive interconnections through the wafer, a hole is etched, insulated, and metallized. Active or passive devices may be formed on either or both sides of the wafer and connected to a substrate by solder pads without the use of beam leads or flying lead bonding.

3,648,132

MULTILAYER CAPACITOR AND PROCESS FOR ADJUSTING THE VALUE THEREOF

Charles C. Rayburn, Falls Church, Va., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Apr. 20, 1970, Ser. No. 29,944
Int. Cl. H01g *3/07, 3/26*
U.S. Cl. 317—261 **14 Claims**



Multilayer capacitor is formed so that certain of its alternating layers of electrodes have marginal portions which terminate at an edge of the capacitor while others are located entirely internally of the capacitor so that their marginal portions are positioned short of the edge. By removing some of the dielectric material which separates the concealed electrode margins from the edge, the concealed electrodes can be electrically connected to the electrodes terminating at the edge to increase the capacitance of the capacitor. The process permits a production batch of capacitors which normally includes a great percentage of capacitors differing from a desired value by more than acceptable tolerance levels to be simply and quickly adjusted so that all, or substantially all, of the capacitors in the batch will fall within the accepted tolerance level. The adjusting is done without altering the dimensions of the capacitors or disturbing the electric field region in any manner. In one embodiment of the invention, a plurality of different sized electrode areas are formed in one plane. By removing material from the several edges of the capacitors to expose various combinations of these areas, the value of the capacitor can be varied over a large range. For example, by providing three different size electrode areas, it is possible to achieve a capacitor having capacitance values in whole number multiples of each other in a range of from one to nine capacitance units. In another modification, a conductive terminal coating connecting all electrode areas of like polarity can be removed from certain edges of the capacitor to provide selective downward adjustment of the capacitor value.

3,648,133

UNIFORM ELECTROSTATIC CHARGING OF A PHOTOCONDUCTIVE INSULATING SURFACE

Algird G. Leiga, Pittsford, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Filed Mar. 31, 1970, Ser. No. 24,288
Int. Cl. G03g *13/00*
U.S. Cl. 317—262 A **15 Claims**

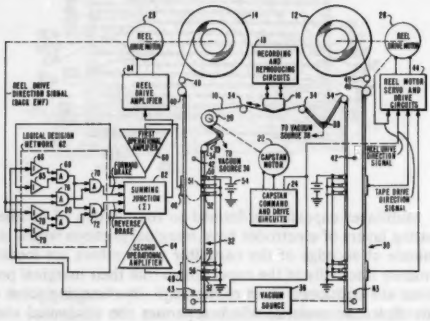
Method for uniformly charging a photoconductive insulating surface. A nonuniform charge density is formed on the photoconductive insulating surface and is thereafter con-

tacted with an insulating material causing the charged surface to attain a uniform charge density in contacted areas.

3,648,134
REEL SERVOSYSTEM

Azmi S. Audeh, Camarillo; Anil N. Deodhar, West Los Angeles, and Henry G. Glattfelder, Los Angeles, all of Calif., assignors to Ampex Corporation, Redwood City, Calif.

Filed Nov. 17, 1969, Ser. No. 877,278
Int. Cl. B65h *59/38*
U.S. Cl. 318—6 **15 Claims**

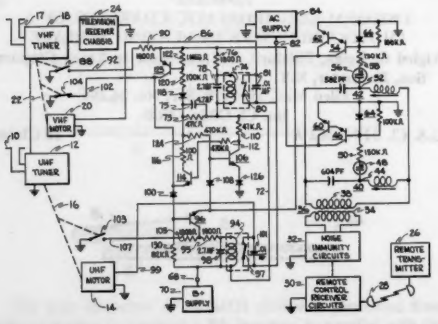


A reel servosystem for a digital magnetic tape transport responds to tape loop length signals from two spaced-apart linear sensors in a vacuum chamber and digital signals representing tape direction on either side of the tape loop formed by the chamber to control a reel motor independent of a capstan motor. The digital signals and sensor signals are combined in a logic network to introduce selective reel drive braking when the tape loop is somewhere between the sensors and the reel drive is moving opposite the capstan drive. The linear sensors otherwise generate analog signals to control loop length in proportional fashion, to maintain the loop at selected reference positions within the vacuum chamber dependent on direction.

3,648,135
REMOTE-CONTROLLED TELEVISION TUNER MOTOR SWITCHING CIRCUIT

Lyle Bruce Juroff, and Lawrence Mark Lunn, both of Indianapolis, Ind., assignors to RCA Corporation

Filed May 11, 1970, Ser. No. 36,149
Int. Cl. H02p *1/54*
U.S. Cl. 318—101 **3 Claims**

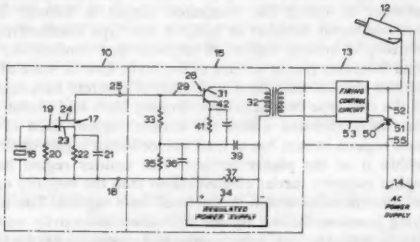


A remote-controlled television receiver includes a VHF and a UHF tuner each having tunable resonant circuits which are adjusted by the gear train of a remotely controlled motor. The tuners are connected so that during UHF operation the VHF tuner provides amplification of the UHF tuner IF signal output. A relay switch is operatively connected to the VHF motor to control the motor energization. Switch means are coupled to the VHF tuner motor gear train and provide an indication when the VHF tuner is adjusted for amplification of the UHF tuner IF signal output. A bistable multivibrator is coupled to the switch means in a manner so that the multivibrator changes states in response to the switch indication. A relay winding current control means responds to the change in state to prevent current from flowing into the relay winding. This causes the relay switch to open and deenergizes the VHF motor. A second relay switch is operatively connected to the UHF motor to control the motor energization. A second relay current control means is connected to permit a flow of current through the second relay winding only when the switch indication is present.

3,648,136
TRANSDUCTION, CONTROL AND MEASUREMENT OF VIBRATION IN VIBRATORY APPARATUS

Werner Krajewski, Stoney Creek, and John Nahirny, Hamilton, Ontario, both of Canada, assignors to Syntron (Canada) Limited, Stoney Creek, Ontario, Canada

Filed Oct. 27, 1969, Ser. No. 869,541
Claims priority, application Canada, Nov. 4, 1968, 034253
Int. Cl. H02k *33/00*
U.S. Cl. 318—128 **3 Claims**

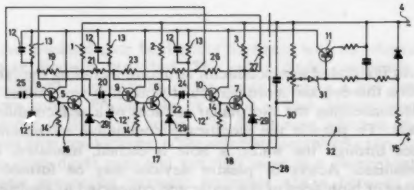


A method and apparatus for transducing the amplitude of vibration of a mechanical vibratory device into electrical energy, using a field effect transistor. Preferably an accelerometer is mounted on the device and oriented for relative oscillation in the direction of vibration.

3,648,137
BRUSHLESS DIRECT CURRENT MOTOR

Winfried Mieslinger, Nurnberg, Germany, assignor to Gebr. Buhler Nachfolger GmbH, Nurnberg, Germany

Filed Mar. 30, 1970, Ser. No. 23,794
Claims priority, application Germany, Mar. 29, 1969, P 19 16 229.9
Int. Cl. H02k *29/00*
U.S. Cl. 318—138 **4 Claims**



In a transistor control circuit which comprises a number of control stages corresponding to the number of windings of a

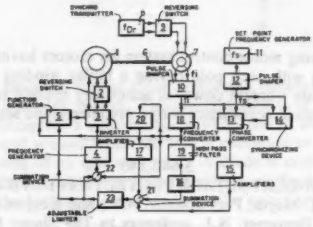
multipole stator, the control stages are joined together to form a closed chain, each control stage being connected to the following control stage by means of a first RC network, and being connected to the preceding control stage by means of a second RC network. The said first RC networks are all of uniform rating and the said second RC networks are also all of uniform rating but of a rating which differs from that of the first RC networks, and the first and second RC networks connected to the input of each control stage have a common resistance or capacity component.

3,648,138

ARRANGEMENT FOR FREQUENCY-ANALOGOUS SPEED CONTROL OF AN INDUCTION MACHINE FED THROUGH AN INVERTER

Horst Kalis, Hamburg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 5, 1970, Ser. No. 1,075
Claims priority, application Germany, Jan. 4, 1969, P 19 00 347.5
Int. Cl. H02p 7/42
U.S. Cl. 318—231 **9 Claims**



A speed control system for an induction motor includes an inverter coupled to the motor stator winding and a second induction machine with its rotor coupled to the motor shaft. The stator of the second machine is energized with a constant-frequency voltage. The frequency of the rotor voltage of the second machine is determined by the stator voltage frequency and the shaft speed. The signal from a reference frequency generator and the rotor frequency are applied to a phase comparator and a synchronizing device, the output signal thereof being applied to a limiter. The rotor frequency is also applied to a frequency detector, the output signal of which is applied to a filter, a differential stage, a device for regulating the inverter voltage or current and a frequency generator that controls the inverter frequency. The filter passes the AC component to the limiter. The output of the differential stage also is applied to the limiter. The limiter output is applied to the frequency generator and to the regulating device to control the motor speed and to maintain the motor flux constant.

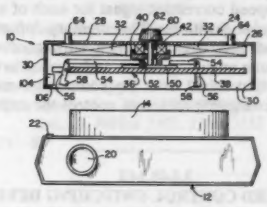
3,648,139

APPARATUS FOR MOVING A MEMBER TO A SELECTED POSITION

Robert Friedman, 18 Raymond Avenue, Spring Valley, N.Y.

Filed July 8, 1970, Ser. No. 53,136
Int. Cl. G05b 11/16
U.S. Cl. 318—265 **14 Claims**

The apparatus is adapted to be used in conjunction with a rotatable member having a plurality of elements therein and is operable to rotate the member to position a selected one of the elements at a station. The apparatus includes a driving means connectable with the member and a plurality of switches each positioned to correspond to a different element for connecting a source of energy with the driving means when moved from an open to a closed state to energize the driving means. Disconnect means is movable with the driving



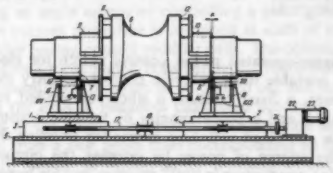
means for engaging and moving said switches back to said open state.

3,648,140

ARRANGEMENT FOR ADJUSTMENT OF THE POSITION OF THE SUPPORTING POSTS FOR A CYLINDRICAL BODY UPON WHICH A LAYER OF WELD METAL IS BEING DEPOSITED

Vladimir Majek; Anton Krajmer, and Zdenek Smitmajer, all of Bratislava, Czechoslovakia, assignors to Vyskumong ustav zvaracsky, Bratislava, Czechoslovakia

Filed June 22, 1970, Ser. No. 47,942
Claims priority, application Czechoslovakia, Aug. 1, 1969, 5354/69
Int. Cl. G05d 3/04
U.S. Cl. 318—282 **4 Claims**



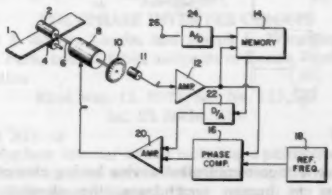
An arrangement for adjustment of the position of supporting posts of a cylindrical body in order to compensate for thermal expansion in its longitudinal direction. In the course of depositing a metallic layer on the circumference of the body by welding on, a minimum clearance is maintained between the faces of the cylindrical body and both supporting posts, so as to maintain the position of the longitudinal center of the cylindrical body in the center of the distance between the supporting posts.

3,648,141

TAPE DRIVE ERROR-CANCELLING SYSTEM

David W. Scheer, Littleton, Colo., assignor to Honeywell, Inc., Minneapolis, Minn.

Filed Mar. 11, 1971, Ser. No. 123,339
Int. Cl. H02p 5/16
U.S. Cl. 318—314 **4 Claims**



A tape drive system has a capstan speed control circuit using a comparator means for comparing a capstan speed

responsive variable frequency signal with a reference frequency proportional to a desired capstan speed. A data storage memory is arranged to store a separate predetermined capstan speed correction signal for each of a plurality of capstan angular positions. The memory information is sequentially read concurrently with a sensing of each corresponding capstan angular position and applied in combination with an output signal from the comparator means to a capstan motor energizing means to control the capstan rotational speed.

3,648,142

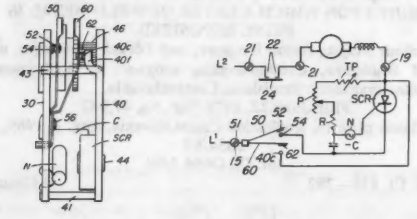
INFINITE SPEED CONTROL SWITCHING DEVICE FOR USE WITH ELECTRIC MOTORS IN PORTABLE TOOLS

Lawrence G. Corey, Rockville, and David W. Johnson, Newington, both of Conn., assignors to Arrow-Hart, Inc.

Filed Nov. 21, 1969, Ser. No. 878,613

Int. Cl. H02p 7/28; H02k 7/14

U.S. Cl. 318—345 **8 Claims**



A trigger-operated power control switch for electric motors in portable tools, wherein control circuitry including a condenser, a fixed resistor, a silicon-controlled rectifier, a neon tube, and a potentiometer or variable resistance with which is combined switching means for isolating these parts from the source of power by opening the circuit in both powerline conductors in "off" position and for bypassing said control circuitry in full "on" position. The trigger operates the potentiometer and also controls the switching operations.

3,648,143

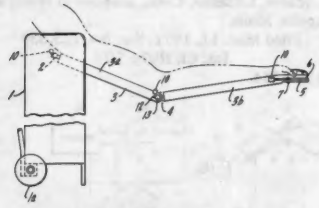
AUTOMATIC WORK-REPEATING MECHANISM

Kenneth B. Harper, Winnetka, and Hubert J. Tremblay, Roselle, both of Ill., assignors to Harper Associates, Inc., Winnetka, Ill.

Filed Aug. 25, 1969, Ser. No. 852,538

Int. Cl. G05b 19/42

U.S. Cl. 318—568 **22 Claims**



An electric motor-controlled device having elements corresponding to human appendages, the elements being manually movable to perform a function recorded on tape, the elements thereafter repeating the function in response to repeated playbacks of the tape.

3,648,144

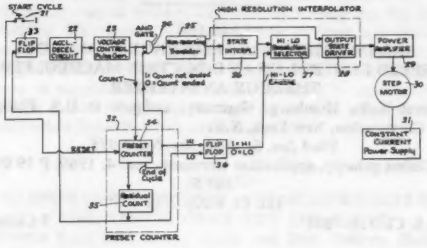
STEPPING MOTOR CONTROL SYSTEM

Philip J. Rosen, Oak Park, Mich., assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Dec. 29, 1969, Ser. No. 888,648

Int. Cl. H02k 37/00

U.S. Cl. 318—696 **2 Claims**



A stepping motor control system for motors having at least two poles with each pole having a bifilar winding with two input points wherein power is selectively applied to the two input points in accordance with a predetermined sequence.

3,648,145

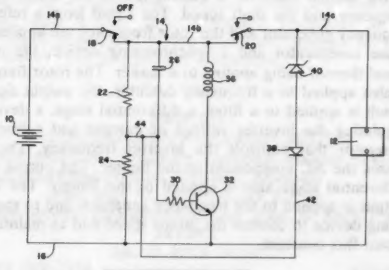
UNDERVOLTAGE PROTECTION DEVICE

Bennett A. Meyer, Port Chester, N.Y., and Kenyon E. B. McGuire, Demarest, N.J., assignors to The Singer Company, New York, N.Y.

Filed May 8, 1970, Ser. No. 35,701

Int. Cl. H02j 7/00

U.S. Cl. 320—13 **1 Claim**

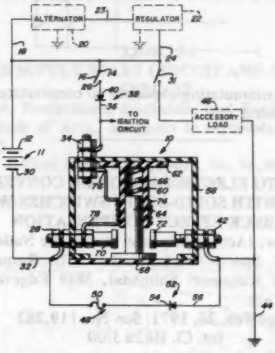


An undervoltage protection device for a voltage source and a load wherein a first and second switch are connected in a current path established between the voltage source and the load, with each of the switches being adapted to provide an open circuit in the current path. A first circuit is provided for closing the second switch in response to the first switch being closed, the circuit being operable, unless disabled, to open the second switch a predetermined time interval after the first switch closes. An additional circuit disables the first circuit in response to a predetermined minimum output from the voltage source.

3,648,146
ALTERNATOR CIRCUIT PROTECTOR

Wayne N. Rollen; Larry J. Strong, and Hurschel H. Rolen, all of 801 East Baker Street, Plant City, Fla.

Filed Mar. 20, 1970, Ser. No. 21,233
Int. Cl. H02j 7/00
U.S. Cl. 320—25 8 Claims

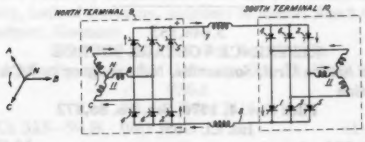


A relay assembly having a coil connected between the terminals of a vehicle battery. The switch contacts of the relay assembly complete a connection between one of the battery terminals and ground when the coil is energized in response to the closing of an ignition switch. A diode is connected in the coil circuit to prevent the connection of the battery to ground if the battery is connected with the wrong polarity.

3,648,147
STARTING CONTROL SCHEME FOR RECTIFIER-INVERTER SYSTEMS

Bernard D. Leete, Newtown Square, Pa., assignor to General Electric Company

Continuation-in-part of application Ser. No. 754,921, Aug. 23, 1968. This application Nov. 12, 1970, Ser. No. 88,668
Int. Cl. H02m 5/40
U.S. Cl. 321—2 27 Claims

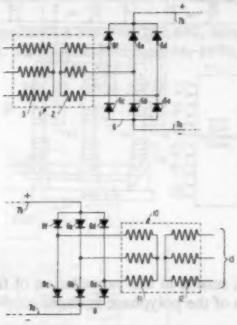


A high-voltage electric power converter comprises a plurality of electric valves interconnected in a bridge configuration. In operation the valves are cyclically fired in a predetermined normal sequence by a series of relatively short gate pulses respectively applied thereto. For successful starting, the controls are arranged (1) to idle until the concurrence of a starting command and a proper instant of time for firing any one of said valves, and then (2) to apply simultaneously a gate pulse to that one valve and a gate pulse to the immediately preceding valve in said normal sequence. The controls are preconditioned so that the initial firing angle is within certain limits that ensure continuous conduction by the preceding valve at least from the starting instant to the time at which the succeeding valve is fired.

3,648,148
CONTROL MEANS FOR AN AC-DC OR DC-AC ENERGY CONVERTER FOR CARRYING DIRECT CURRENT ENERGY

Louis Bechet, Decines, and Claude Bertholon, Saint-Etienne, both of France, assignors to Compagnie Generale D'Electricite, Paris, France

Continuation-in-part of application Ser. No. 791,616, Jan. 16, 1969. This application June 10, 1970, Ser. No. 44,957
Int. Cl. H02m 1/02, 1/18, 7/12
U.S. Cl. 321—5 9 Claims



Disclosed herein is a high-voltage direct current converter control device for a direct current energy transmission line comprising an angle computer controlling a pulse generator. The direct current powerline is equipped at each of its ends with a bridge having control rectifier cells. The optimum cell ignition times are calculated considering the requirements of a power transmission program to be carried out and impulses are fed to the cells at instances calculated according to the techniques of the present invention. In accordance with this technique, from a first pulse train corresponding to the successive zero passage of voltage at the terminals of one of the cells of the converter is derived a second pulse train comprising six times as many pulses as the first pulse train, the pulses in the second pulse train being equally spaced over a time T defined as the time between the successive pulses in the first pulse train. The pulses in the second pulse train correspond to the theoretical times for the zero passages of the voltage at the terminals of the six cells of the converter bridge. The actual zero passage times are measured and numbers ϵ proportional to the interval of time separating the passage of theoretical zeros and the actual zeros at each of the cells are measured and the maximum value of ϵ is determined. Further, two numbers termed the rectifier stop and the inverter stop are determined on the basis of the maximum value of ϵ, the bridge regulation angle r, the maximum trespass angle of the cells u and the angle of the extinction of the cells γ. On the basis of the rectifier stop, the inverter stop and the second pulse train, ignition impulses for the cells are developed.

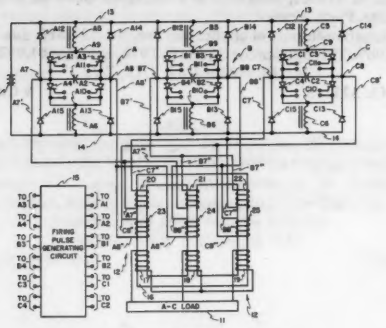
3,648,149
POLYPHASE INVERTER CIRCUIT

Harold J. Brown, Lorain, and Joseph L. Winpisinger, Fairview Park, both of Ohio, assignors to Lorain Products Corporation

Filed Mar. 11, 1971, Ser. No. 123,349
Int. Cl. H02m 7/00
U.S. Cl. 321—5 10 Claims

A polyphase inverter circuit including a plurality of bridge-commutated inverter networks for providing first and second sets of polyphase voltages. These voltages are applied in power-aiding relationship to respective electrically isolated sets of primary windings on a polyphase output transformer. The instantaneous current through each primary winding is

controlled by the algebraic combination of voltages from the inverter networks supplying voltage thereto at that instant.



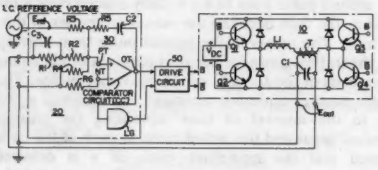
This control results in the cancellation of the third harmonic components of the polyphase voltages supplied to a load.

3,648,150

APPARATUS FOR PRODUCING A LOW-DISTORTION PULSE WIDTH MODULATED INVERTER OUTPUT

Andress Kernick; Manvel A. Geyer, both of Lima, and Glenn W. Ernsberger, Worthington, all of Ohio, assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 26, 1970, Ser. No. 14,314
Int. Cl. H02m *1/12, 7/52;* **H03c** *1/00*
U.S. Cl. 321—9 A **11 Claims**



The invention comprises apparatus for comparing the filtered output of a pulse width modulated inverter circuit with an AC reference voltage waveform and generating output voltage signals to control the inverter drive circuit to the extent necessary to produce an inverter output waveform substantially duplicating the reference voltage waveform and substantially void of low-order harmonics.

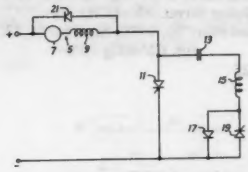
3,648,151

CHOPPER CIRCUIT

David Gurwicz, Gateshead, England, assignor to Sevcon Engineering Limited, Gateshead, Co. Durham, England

Filed Aug. 7, 1969, Ser. No. 848,298
Claims priority, application Great Britain, Aug. 8, 1968, 38,015/68
Int. Cl. H02m *7/44*
U.S. Cl. 321—43 **2 Claims**

A variable mark-space ratio pulse controller in which a main thyristor for controlling the supply of direct current to a load is commutated by discharge of a capacitor occuring immediately on reversal of the charge thereon so that the use of a separate thyristor which is turned on to pass discharge current from the commutating capacitor to commutate the main thyristor is avoided.

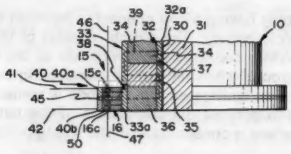


3,648,152

THERMAL TO ELECTRICAL POWER CONVERSION SYSTEM WITH SOLID-STATE SWITCHES WITH SEEBECK EFFECT COMPENSATION

George M. Low, (Acting Administrator of the National Aeronautics and Space Administration with Respect to an Invention of Katsunori Shimada), 3840 Edgeview Drive, Padadena, Calif.

Filed Feb. 26, 1971, Ser. No. 119,282
Int. Cl. H02n *5/00*
U.S. Cl. 322—2 **11 Claims**



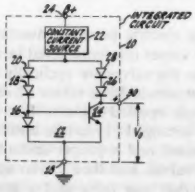
A thermal to electrical power conversion system is disclosed in which switching of electrical currents to a load is performed by solid-state switches in which their Seebeck effect reduces the losses due to the ohmic voltage drops thereacross. In a system with a thermoelectric generator as the power source, the switches are designed with their source electrodes formed by the generator's cold shoe at a temperature higher than a remotely located heat sink which forms the switches' drain electrodes. The gate electrodes of the switches are connected to an electronic switch controller, which controls their conduction and cutoff states.

3,648,153

REFERENCE VOLTAGE SOURCE

Stefano Arturo Graf, Somerville, N.J., assignor to RCA Corporation

Filed Nov. 4, 1970, Ser. No. 86,872
Int. Cl. G05f *1/60*
U.S. Cl. 323—1 **10 Claims**



A temperature compensated reference voltage source is provided which is suitable for fabrication using integrated circuit techniques. A constant current source is coupled via first and second current paths to a reference terminal. Each

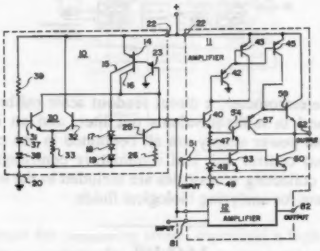
of the first and second current paths includes one or more diodes. A current repeater circuit, which includes a further diode and a transistor having proportionally related conduction characteristics, is coupled between the two current paths and the reference terminal to provide substantially constant currents in each of the first and second paths. The currents are selected so that a difference voltage, produced across the emitter-collector electrodes of the transistor of the repeater circuit, is substantially constant as a function of temperature.

3,648,154

POWER SUPPLY START CIRCUIT AND AMPLIFIER CIRCUIT

Thomas M. Frederiksen, Scottsdale, and Ronald W. Russell, Mesa, both of Ariz., assignors to Motorola, Inc., Franklin Park, Ill.

Filed Dec. 10, 1970, Ser. No. 96,904
Int. Cl. G05f 1/48
U.S. Cl. 323—22 T **15 Claims**



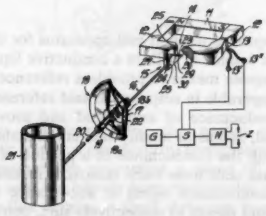
An operational amplifier capable of operating over a relatively wide variation of power supply voltages and temperature employs a high-beta lateral PNP buffer stage single input or dual input versions. Reference biasing voltage for operating the amplifier circuit is obtained from a current source supplying current through a string of series connected diodes, and a differential amplifier start circuit is provided in order to assure that current commences flowing through the diode string since the current source driving the string is biased from the same diode string.

3,648,155

ELECTROMECHANICAL TRANSDUCER ASSEMBLY

Gerhard Soehner, Geradstetten, and Gerd Hoehne, Ludwigsburg, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Dec. 26, 1968, Ser. No. 787,034
Claims priority, application Germany, Dec. 23, 1968, P 16 73 938.1
Int. Cl. H01c 7/16
U.S. Cl. 323—94 H **11 Claims**



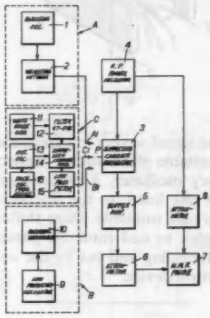
An electromechanical transducer assembly wherein the magnitude of electric output signals produced by a magnetically controllable semiconductor is a function of the position of a magnetically conductive wedge or sickle with reference to an airgap in the yoke of a permanent magnet system. The semiconductor is installed in the yoke and the wedge or sickle is reciprocated or pivoted by an adjustable element of an internal combustion engine.

3,648,156

QUIET SLOT SCANNING

Leslie Kearton Parker, High Wycombe, England, assignor to Perkin-Elmer Limited, Beaconsfield, Buckinghamshire, England

Continuation of application Ser. No. 732,697, May 28, 1968, now abandoned. This application May 26, 1970, Ser. No. 41,695
Int. Cl. G01n 27/78
U.S. Cl. 324—0.5 R **6 Claims**



Decoupling of multiple resonances in a nuclear magnetic resonance analysis is provided by subjecting the sample to radio frequency decoupling energy centered about an RF sample irradiating frequency f_1. The radio frequency decoupling energy defines a quite slot characterized by the absence of decoupling energy and which is symmetrical about the frequency f_1. As sample scanning occurs, the slot progresses through the spectrum thereof enabling observance of an N.M.R. resonance substantially free from spin-coupling.

3,648,157

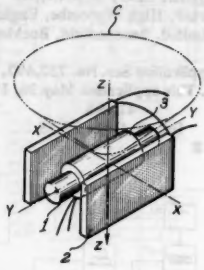
METHODS AND APPARATUS FOR MEASURING MAGNETIC FIELDS BY GYROMAGNETIC RESONANCE

Andre Maxime Philippe Denis, Herblay, and Guy Marie Camille Ripart, Plessis-Robinson, both of France, assignors to Sud-Aviation Societe Nationale de Constructions Aeronautiques, Paris, France

Filed Dec. 11, 1963, Ser. No. 329,920
Claims priority, application France, Dec. 11, 1962, 918217
Int. Cl. G01r 33/08
U.S. Cl. 324—.5 **9 Claims**

1. In an apparatus for measuring magnetic fields by gyromagnetic resonance, of the kind having a single container with a gyromagnetic substance and a detecting coil wound around said container, said gyromagnetic substance being subjected to the magnetic field to be measured and excitation at a suitable frequency thereby to change the electron energy level of the substance; the improvement comprising, in combination, two pairs of excitation coils respectively aligned along two mutually perpendicular axes and disposed around the detecting coil in a plane perpendicular to said detecting coil, the excitation coils aligned along the same axis being interconnected, a variometer having stationary windings respectively connected to the pairs of aligned excitation coils and a rotatable field winding, an amplifier the

input of which is connected to the detecting coil while its output is connected to said rotatable field winding, an auxiliary oscillator generating signals at very low frequency under voltages of low amplitude, a resistor and a capacitor which are connected with said oscillator and respectively to the two pairs of aligned excitation coils, an analogue frequency-meter connected to the output of the amplifier, a filter-amplifier connected to the output of said frequency-meter in



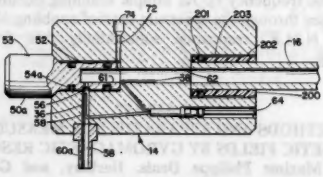
order to extract the signal at very low frequency delivered by the oscillator, a rotatable phase-shifter connected to the output of the auxiliary oscillator, a phase comparison device connected, on the one hand, to the filter-amplifier and, on the other hand, to said rotatable phase-shifter, and a motor mechanically coupled to said rotatable phase-shifter and to the rotatable field winding and fed by the output voltage of said phase comparison device.

3,648,158

CONDUCTIVITY CELL FOR PARTICLE COUNTING SYSTEM

Bernard Parker, Westport, Conn., assignor to Contraves AG, Zurich, Switzerland

Filed June 1, 1970, Ser. No. 41,982
Int. Cl. G01n 27/42
U.S. Cl. 324—30 B **3 Claims**



For use in systems for counting particles suspended in a liquid by detection of changes in the impedance of a fluid path caused by passage of particles through an aperture, a conductivity cell having a pair of electrodes with an easily removable aperture disposed therebetween and a vent disposed with respect to the electrodes to permit purging of the cell after an analytical run.

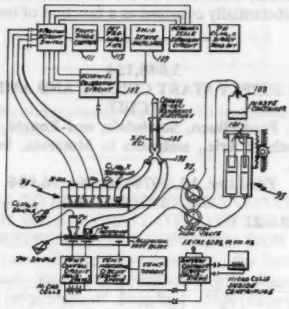
3,648,159

PORTABLE, SELF-CONTAINED SYSTEM FOR ANALYZING BIOLOGICAL FLUIDS OR THE LIKE

Marion J. Stansell, and Shelby J. Stansell, both of USAF Academy, Colo., assignors to The United States of America as represented by the Secretary of the Air Force, by said Marion J. Stansell

Filed Mar. 11, 1970, Ser. No. 18,574
Int. Cl. G01n 27/42
U.S. Cl. 324—30 R **4 Claims**

A completely portable, self-powered system for rapidly and accurately measuring whole blood hematocrit and pH and levels of sodium, potassium, chloride and the other ions in blood and other fluids. The system includes a compact carrying case which contains an aluminum heat block with a glass electrode chamber therein. Individual selective ion electrodes are fitted in the electrode chamber. A reference electrode, a high-impedance electrode switch, a high-impedance



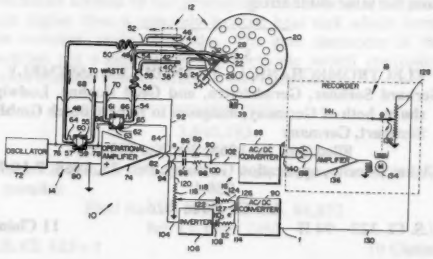
solid-state electrometer, a direct readout scale calibrated in pH units and in milliequivalents per liter, and an integral rechargeable power supply are all contained in the carrying case. A heat control unit and a miniature centrifuge along with blood collecting accessories are included in the self-contained system for analyzing biological fluids.

3,648,160

METHOD AND APPARATUS FOR THE HIGHLY ACCURATE, AUTOMATIC DETERMINATION OF THE HEMATOCRIT OF WHOLE BLOOD SAMPLES

Murray W. Beaver, Yonkers, N.Y., assignor to Technicon Corporation, Tarrytown, N.Y.

Filed Dec. 1, 1969, Ser. No. 881,212
Int. Cl. G01n 27/42
U.S. Cl. 324—30 B **28 Claims**



New and improved method and apparatus for determining the percentage volume of cells in a conductive liquid are provided and comprise means to provide a reference signal, detector means operable in response to said reference signal to detect the conductance of said liquid and provide a conductance signal, means to modify said conductance signal in accordance with the conductance of a portion of said liquid from which said cells have been removed, means to further modify said conductance signal in accordance with a cell shape factor, and means to respectively sum, convert and divide said signals to provide indicia of said percentage cell volume. In a second embodiment, temperature responsive means are substituted for said first-mentioned conductance signal modifying means and are operative to modify said con-

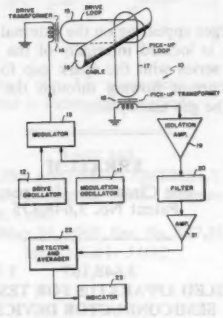
ductance signal in accordance with changes in ambient temperature.

3,648,161

MAGNETIC LINEARITY TENSIDUCTOR FOR MEASURING TENSION IN A RUNNING LINE

Herman A. Soulant, Jr., Rockville, Md., assignor to The United States of America as represented by the Secretary of the Navy

Filed Oct. 29, 1969, Ser. No. 872,266
Int. Cl. G01r *33/00*
U.S. Cl. 324—34 **7 Claims**



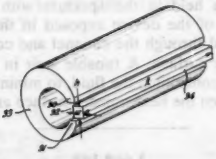
A system for measuring stress, especially a high degree of stress, in a magnetically conductive member which provides for the generation of a magnetic field about the member and a pickup mechanism which is magnetically coupled to the member. The output of the pickup mechanism is passed through a filter rejecting all but the third harmonic of the field-generating drive signal frequency. The third harmonic is related to the stress in the member since a varying stress in the member similarly varies the nonlinearity of the B–H curve of the member. This in turn varies the amount of the third harmonic signal present at the filter output.

3,648,162

PARAMAGNETIC GAS PARTIAL PRESSURE MEASURER

Carl N. Cederstrand, Brea, and Michael Dodson, Fullerton, both of Calif., assignors to Beckman Instruments, Inc.

Filed Oct. 24, 1969, Ser. No. 869,236
Int. Cl. G01r *33/12*
U.S. Cl. 324—36 **20 Claims**



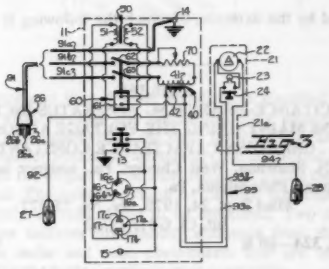
Apparatus for determining the partial pressure of a paramagnetic gas in a gas mixture, comprising: an elongated C-shaped magnet for generating a plane of high-magnetic flux density over a relatively large rectangular area, and a region of low-flux density at short distances from such plane; and a test body in the shape of a rectangular parallelepiped having dimensions approximately equal to the size of the rectangular area and the distance between the plane of high-flux density and the region of low-flux density. Means are provided for pivotally mounting the test body with one surface thereof aligned with the rectangular area and an opposite surface aligned with the region of low-flux density, the test body being mounted for movement in a direction perpendicular to the plane of high-magnetic flux density.

3,648,163

ELECTRICAL GROUND APPARATUS FOR TESTING THE QUALITY OF CONDUCTORS

Champ D. Pinner; Cecil E. Sligh; James L. Diehl, and Wade H. Garland, Jr., all of Hartsville, S.C., assignors to Sonoco Products Company, Hartsville, S.C.

Filed Dec. 2, 1969, Ser. No. 881,523
Int. Cl. G01r *31/02*
U.S. Cl. 324—51 **11 Claims**



Apparatus for testing the quality of an electrical ground conductor by completing a high-current low-voltage series circuit between the electrical ground conductor being tested and ground, and observing indicating means disposed in series therewith. Circuitry is provided for inducing this high-current low-voltage into the series circuit only when a normally open manually operable switch means is closed and only then, if there is continuity of the electrical ground conductor with ground.

3,648,164

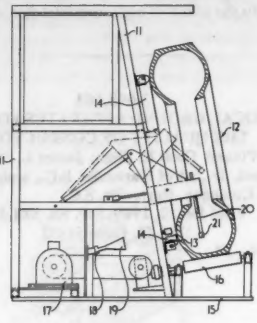
A METHOD AND APPARATUS FOR DETECTING REINFORCEMENT SPACING VARIATION BY MICROWAVE DIFFRACTION

Eric H. Searle, and Eric G. Gould, both of Sutton Coldfield, England, assignors to Dunlop Holdings Limited, London, England

Filed Apr. 28, 1970, Ser. No. 32,599
Claims priority, application Great Britain, May 9, 1969, 23,637/69
Int. Cl. G01n *27/04*
U.S. Cl. 324—58.5 A **12 Claims**

A method and apparatus for detecting variation in the spacing of an array of conducting strands embedded within a rubber or plastics medium. A transmitter of microwave radiation is placed on one side of the array and a detector on the opposite side, the frequency of the radiation being chosen so that the transmission of the signal through the array is affected by the spacing of the conducting strands. The array is

moved past the transmitter and the detector, any variation in strand spacing being shown by a variation in the signal



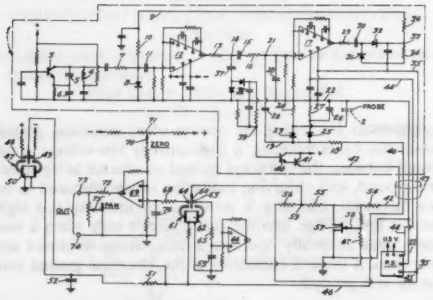
received by the detector, of which the following is a specification.

3,648,165

CAPACITANCE-MEASURING APPARATUS INCLUDING MEANS MAINTAINING THE VOLTAGE ACROSS THE UNKNOWN CAPACITANCE CONSTANT

Elbert N. Shawhan, West Chester, Pa., assignor to Sun Oil Company, Philadelphia, Pa.

Filed Sept. 24, 1970, Ser. No. 75,077
Int. Cl. G01r *11/52*
U.S. Cl. 324—60 R **15 Claims**



The total voltage across a series resistance-capacitance circuit (wherein the capacitance is that of a measuring probe) supplied by an alternating current source is controlled so as to maintain the voltage across the capacitance constant as the measured capacitance varies. This provides a linear total voltage-capacitance characteristic over a wide capacitance range. The effects of temperature and aging on component values are eliminated by continuously correcting the slope of the voltage-capacitance characteristic.

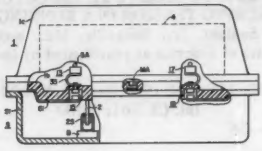
3,648,166

ELECTRICAL DEVICE HAVING CURRENT LIMITER AND SPARK GAP

Henry W. Redecker, Raleigh, and William J. Zisa, Cary, both of N.C., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 28, 1968, Ser. No. 708,854
Int. Cl. G01r *1/00, 1/04*
U.S. Cl. 324—110 **4 Claims**

An electrical device such as a watthour meter has a movement located within an enclosure. Terminals pass through the enclosure for the purpose of establishing connections between the device and an external circuit. A spark gap is secured to the enclosure and is positioned externally of the enclosure for the purpose of establishing a shunt path to



ground for surges appearing on the external circuit. A silicon carbide block is located internally of the enclosure and is connected in series with the spark gap for the purpose of limiting the current flowing through the spark gap after breakover of the gap takes place.

ERRATUM

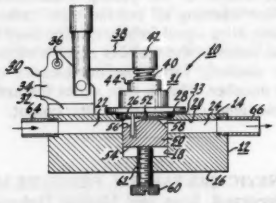
For Class 324—115 see:
Patent No. 3,648,175

3,648,167

FLUID-COOLED APPARATUS FOR TESTING POWER SEMICONDUCTOR DEVICES

Don Ryall Purdy, Florham Park, and William Edward Donnelly, Edison, both of N.J., assignors to RCA Corporation

Filed June 1, 1970, Ser. No. 41,843
Int. Cl. G01r *1/04*
U.S. Cl. 324—158 T **7 Claims**



The apparatus includes a base member having an upper surface and a cavity therein, with a channel in the interior which communicates with the cavity. The surface has an aperture communicating with the cavity. A power semiconductor device is held in the aperture with an outer heat transfer surface of the device exposed in the cavity, and a fluid is circulated through the channel and cavity and across the heat transfer surface. A tunable weir in the cavity provides means for controlling the fluid, to minimize the thermal resistance between the heat transfer surface and the fluid.

3,648,168

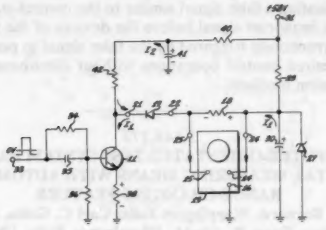
APPARATUS FOR MEASURING REVERSE RECOVERY CHARACTERISTICS OF DIODES

Roland E. Ripplinger, Phoenix, Ariz., assignor to Honeywell Information Systems Inc., Waltham, Mass.

Filed Dec. 16, 1970, Ser. No. 98,575
Int. Cl. G01r *31/22*
U.S. Cl. 324—158 D **7 Claims**

The apparatus uses a solid-state circuit in measuring reverse recovery time of diodes used in high-frequency power supplies. The circuit disclosed eliminates the oscillations and other spurious signals, which are often developed

by prior art testing apparatus, and requires a single power supply. The duration and amplitude of forward current in the



diode being tested can be accurately controlled by a transistor connected in series with the diode.

3,648,169

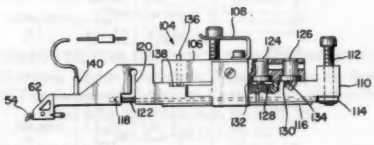
PROBE AND HEAD ASSEMBLY

Mordechai Wiesler, Lexington, Mass., assignor to Teledyne, Inc., Hawthorne, Calif.

Filed May 26, 1969, Ser. No. 827,518

Int. Cl. G01r *31/22*

U.S. Cl. 324—158 F **4 Claims**



A probe and head assembly is provided for use particularly in testing electronically microelectronic devices such as integrated circuit wafers and the like. A very thin probe tip of one piece construction is formed with an integral parallel beam construction and plugs into the head assembly which is adjustable in different coordinate directions.

3,648,170

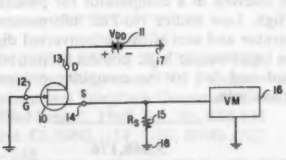
MEASUREMENT OF FIELD EFFECT TRANSISTOR PINCH-OFF VOLTAGE

Milton L. Embree, Laureldale, and William R. Huber, III, Reading, both of Pa., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 8, 1969, Ser. No. 848,444

Int. Cl. G01r *31/22*

U.S. Cl. 324—158 T **8 Claims**



A test circuit for determining the pinch-off voltage of a field effect transistor comprises, in series, a source of unidirectional voltage of a magnitude greater than the expected pinch-off voltage and less than the breakdown voltage, the source and drain electrodes respectively of the field effect transistor under test, and a resistance element of relatively large magnitude, typically, at least one megohm. The gate electrode is grounded and observation of the voltage drop across the resistance element gives a reading differing from theoretical pinch-off voltage by only a small percentage.

3,648,171

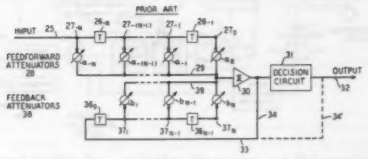
ADAPTIVE EQUALIZER FOR DIGITAL DATA SYSTEMS

Donald Hirsch, Matawan, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 4, 1970, Ser. No. 34,346

Int. Cl. H03h *7/36*

U.S. Cl. 325—42 **5 Claims**



The automatic time-domain equalizer is modified to improve its signal-to-noise and impulse-response dispersal performance by supplementing the basic prior art equalizer with a final equalizer whose tap attenuators are controlled by correlations of the output of the basic equalizer with a distortion error signal. The reference input to the final equalizer is the appropriately delayed signal to be equalized. Two cascade equalization sections substantially eliminate from the final output the noise and echo components that are normally generated in the basic equalizer when used alone.

3,648,172

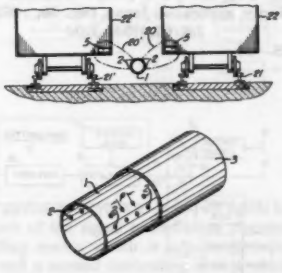
CIRCULAR LEAKY WAVEGUIDE TRAIN COMMUNICATION SYSTEM

Tsuneo Nakahara, Nishinomiya; Noritaka Kurauchi, Suita Osaka, and Hiroshi Kitani, Osaka, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Oct. 2, 1968, Ser. No. 848,125

Int. Cl. H01q *13/10*

U.S. Cl. 324—51 **3 Claims**

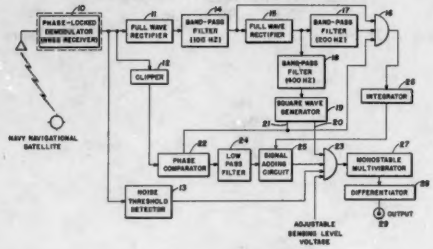


A circular leaky waveguide comprising a metal tube or of a helix waveguide which is provided with a row or a plurality of rows of leakage apertures, each aperture having maximum diameter smaller than a half wavelength of the transmission wave, and spaced at intervals $P<\lambda_0\lambda_g/\lambda_0+\lambda_g$, where λ is free the space wavelength, and λ_g the waveguide wavelength.

3,648,173
TIME RECOVERY SYSTEM FROM A PULSE-MODULATED RADIO WAVE

Henry H. Elliott, Bethesda, Md., assignor to The United States of America as represented by the Secretary of the Navy

Filed Aug. 7, 1970, Ser. No. 61,892
Int. Cl. H04b 7/00; G04c 13/02
U.S. Cl. 325—58 **10 Claims**

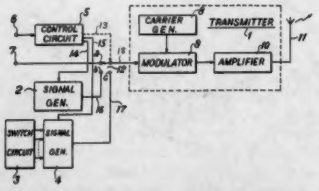


Satellites of the Navy Navigation Satellite System continuously transmit a carrier frequency which is phase modulated with a precisely timed, recurrent phase modulation pattern synchronized to Naval Observatory time. The recurrent phase modulation pattern is a continuous stream of binary bits and comprises a message portion which occurs at a predetermined bit rate and a marker word which occurs at a fixed position in each recurrent modulation pattern and is composed of a signal having a frequency which is a known multiple of the message portion bit rate. Accurate time recovery of the satellite-transmitted signal is accomplished by multiplication of the message portion bit rate to the frequency of the time marker word or signal and subsequently phase comparing the bit rate-derived signal with the incoming satellite signal and producing a pulse when phase coincidence occurs which, in turn, allows examination of a particular multiplied message cycle segment. When this segment is detected a fiducial time mark pulse is produced.

3,648,174
BROADCAST SYSTEM FOR TRANSMITTING A PLURALITY OF CONTROL SIGNALS UNDER PROTECTION AGAINST A FALSE SIGNAL

Masayuki Fukata, 94 Shimorenjaku, Mitaka-shi, Tokyo, Japan

Filed Dec. 4, 1969, Ser. No. 882,085
Claims priority, application Japan, Dec. 10, 1968, 43/89974
Int. Cl. H04b 3/04
U.S. Cl. 325—64 **7 Claims**

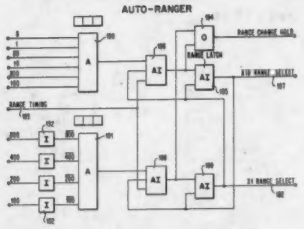


A broadcast system for transmitting a plurality of control signals to control any kind of switches of devices provided at the receiving side by the use of a control signal formed by at least one signal of a predetermined frequency included in the frequency band of broadcast program signal; in which the control signal comprises a control-start signal common to all control operations to be performed and a plurality of particular control signals predetermined so as to respectively correspond to control operations to be performed and transmitted after the control-start signal. This system has means for eliminating a false signal similar to the control-start signal from the broadcast signal before the devices of the receiving side is erroneously triggered by the false signal to perform reliably desired control operations without disturbance in the transmission medium.

3,648,175
COMPUTER-ORIENTATED TEST SYSTEM HAVING DIGITAL MEASURING MEANS WITH AUTOMATIC RANGE-CHANGING FEATURE

John D. Barnard, Wappingers Falls; Carl C. Gaito, Hopewell Junction; Gary R. Giedd, Wappingers Falls; Thomas G. Greene, Lagrangeville; James W. Lind, Hyde Park; Merlyn H. Perkins, Hopewell Junction, all of N.Y., and Charles M. Pross, Arlington, Mass., assignors to International Business Machines Corporation, Armonk, N.Y.

Original application Jan. 15, 1968, Ser. No. 697,676, now Patent No. 3,546,582, dated Dec. 18, 1970. Divided and this application Nov. 20, 1969, Ser. No. 877,552
Int. Cl. G01r 17/06, 15/08
U.S. Cl. 324—115 **18 Claims**



A test system is provided for performing functional tests on combinatorial and sequential monolithic devices with the testing automatically programmed under control of a computer processing unit. The test results can be printed out on a printer, logged on tape and/or punched on cards.

Tests are performed by the system under the control of an operational test program comprised of a plurality of interrelated subprograms. The operational test program is run by a computer processing unit which processes the programmed instructions through an input-output logic control section which sets up the test circuit configurations in and commands to an analog section. The analog section provides the required bias, pin resistor loads and signal levels to a device under test. The test parameter data is sensed by a digital voltmeter for conversion from analog-to-digital data form, and for optional visual display if desired. The digital test parameter data is inserted in a comparator for pass/fail logic comparison. High, Low and/or No-Fail information is added by the comparator and sent with the converted digital information to the input-output logic control section where the data is serialized and fed to the computer processing unit for logging or analysis.

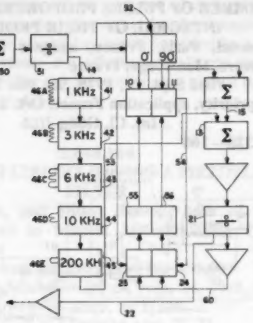
3,648,176
ADJACENT CHANNEL MEASUREMENT TEST SYSTEM

David R. Martin, Agoura, and Walter A. Sauter, Malibu, both of Calif., assignors to American Nucleonics Corporation, Woodland Hills, Calif.

Filed Aug. 20, 1970, Ser. No. 65,561
Int. Cl. H04b 1/04
U.S. Cl. 325—133 **13 Claims**

A system for cancelling or suppressing the amplitude of the carrier and sideband signals of a radio transmitter to

facilitate analysis of spurious and noise outputs from the transmitter is disclosed. The system includes means for deriving a carrier cancelling signal from an actual sample of the transmitter output, signal processing circuitry and summing



means. Also, an electromechanical signal controller is disclosed capable of continuously correcting the amplitude of the cancellation signal by a selected ratio with respect to the transmitter test signal.

3,648,177

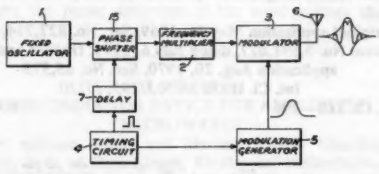
TRANSMITTER FOR DISTANCE-MEASURING SYSTEM

Leon Himmel, Upper Montclair, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed May 26, 1969, Ser. No. 827,751

Int. Cl. G01s 7/28

U.S. Cl. 325—141 **1 Claim**



In a distance-measuring system, the transmitter transmits a gaussian-pulse modulated signal wherein the phase of the carrier frequency is shifted for a predetermined interval of time within the transmitted gaussian pulses.

3,648,178

MULTIPLEX FM TRANSMITTER

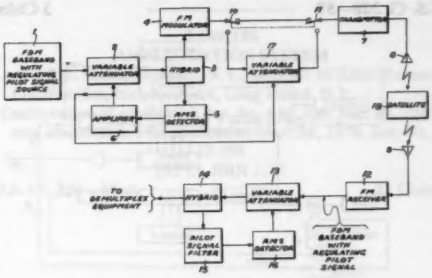
David E. Hershberg, Ridgewood, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Sept. 4, 1969, Ser. No. 855,111

Int. Cl. H04j 1/14, 1/20; H04b 1/02

U.S. Cl. 325—145 **5 Claims**

A first variable attenuator is coupled between the FDM baseband source and the FM modulator. The output signal of the first attenuator is RMS detected to provide a control signal for this attenuator to adjust the amplitude of the baseband signal applied to the FM modulator and, hence, the frequency deviation thereof. An increase in frequency deviation enables a reduction in the EIRP (effective isotropic radiated power) for the same S/N, or an increase in S/N for the same EIRP. A second variable attenuator controlled by the same control signal operates in an inverse fashion, as



compared to the first variable attenuator, on the carrier amplitude to maintain a constant S/N ratio.

3,648,179

CONTROL DEVICE WITH A PLURALITY OF CONTROLLING UNITS WHICH ARE SIMPLY ADJUSTABLE BATH INDIVIDUALLY AND SIMULTANEOUSLY TO DESIRABLE CONDITIONS

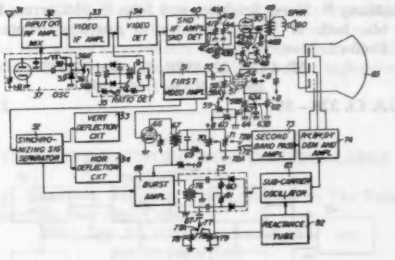
Kazutoshi Ikegami; Hideo Ikeda, both of Kokubunji-shi; Kazumi Takeuchi; Kosuke Kitamura, and Susumu Takahashi, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed June 4, 1969, Ser. No. 830,392

Claims priority, application Japan, June 7, 1968, 43/47265

Int. Cl. H04b 1/16

U.S. Cl. 325—399 **4 Claims**

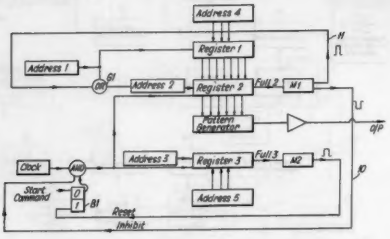


A control device comprises at least two signal transmission channels, each of the signal transmission channels having a first controlling means which is adjustable over a desired wide range and a second controlling means which is preadjusted to a desired condition, one pair of said first and said second controlling means having at least one switch for connecting either one of said first and the second controlling means to its associated signal transmission channel, the switches of the respective signal transmission channels being interlocked with each other for controlling simultaneously the respective signal transmission channels to predetermined desirable conditions.

3,648,180
PULSE GENERATORS

Terence Keith Woodcock, Barton-le-Clay, England, assignor to British Aircraft Corporation Limited, London, England

Filed Oct. 6, 1970, Ser. No. 78,410
Int. Cl. H03k 1/00
U.S. Cl. 328—59 3 Claims

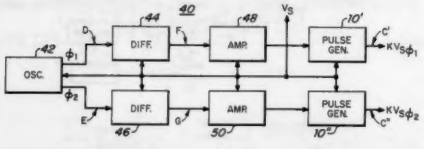


The pulse generator is described in which a pair of storage registers are connected in parallel with one another and initially loaded such that a first of the registers has a substantially smaller unfilled capacity than the second register. A clock generator then feeds pulses equally to the two registers to progressively reduce the unfilled capacity of each register and when the first register has been filled a 'full' signal is generated which causes immediate reloading of the first register to the same initial capacity. A logic circuit connected to selected bit outputs of the first register generates a pulse, or a pulse pattern, during the time taken to fill the first register and when the second register has been filled a second 'full' signal inhibits the feeding of further clock pulses to the register. The total number of pulse cycles is therefore the ratio of the initially unfilled capacity of the second register to the unfilled capacity of the first register.

3,648,181
PULSE GENERATING CIRCUIT FOR PRODUCING PULSES OF AMPLITUDE WHICH IS A MULTIPLE OF THE AMPLITUDE OF THE SOURCE VOLTAGE

Anthony N. Fiore, Brighton, and John D. McCarron, Dunstable, both of Mass., assignor to Spacetac Incorporated, Bedford, Mass.

Filed Oct. 22, 1970, Ser. No. 82,977
Int. Cl. H03k 1/00, 3/02
U.S. Cl. 328—59 2 Claims

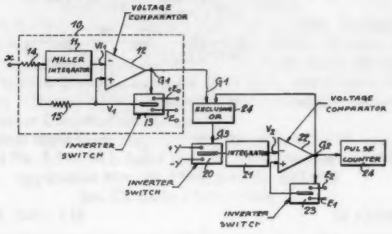


A pulse generating circuit including charge storing means, unidirectional current flow means in series between a first terminal of the charge storing means and a common point; means, adapted for connection with a source of input voltage of predetermined voltage level in relation to the common point, for charging the charge storing means, first means for selectively connecting a second terminal of the charge storing means with the common point to drive the first terminal to a second predetermined voltage level equal to the first predetermined voltage level but opposite in polarity relative to the common point, output means, and second means for connecting to the output means the first predetermined voltage level when the first means for selectively connecting is opened and the second predetermined voltage level when the first means for selectively connecting is closed.

3,648,182
DEVICE FOR CONVERTING TWO MAGNITUDES INTO A NUMBER OF PULSES PROPORTIONAL TO THE INTEGRAL OF THEIR PRODUCT

Alain Carnel, Paris, France, assignor to Compagnie des Compteurs, Montrouge, France

Filed Sept. 28, 1970, Ser. No. 75,849
Claims priority, application France, Oct. 22, 1969, 6936173
Int. Cl. G06g 7/16
U.S. Cl. 328—160 4 Claims

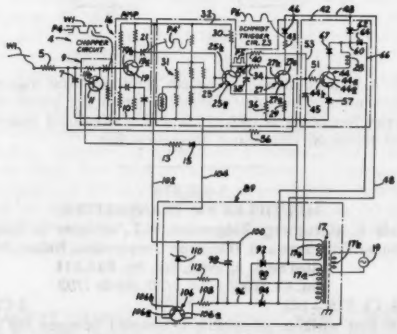


The device comprises a variable cycle ratio modulator on which is applied a first input signal, an inverter-switch connected to the modulator output and on which is applied the second input signal, an integrator circuit connected to the inverter-switch, to a two-threshold comparator and to an inversion device, and a device for counting the signals from the comparator.

3,648,183
SIGNAL LEVEL RESPONSIVE CIRCUIT

Ahdor H. Alton, Lake Zurich, and Mitchell I. Kohn, Skokie, both of Ill., assignors to Gulton Industries, Inc., Metuchen, N.J.

Original application May 26, 1969, Ser. No. 827,714, now Patent No. 3,591,077, dated July 6, 1971. Divided and this application Aug. 20, 1970, Ser. No. 65,575
Int. Cl. H03k 3/15, 3/295, 17/30
U.S. Cl. 328—196 6 Claims



A signal level responsive circuit including a Schmitt trigger-type circuit is provided which acts both as a signal level responsive circuit and a phase detector by energizing at least one of the current control devices of the circuit with a pulsed waveform voltage resembling a half-wave rectified AC voltage. The signal fed to the control input terminal of the

Schmitt trigger circuit comprises a chopped waveform of the varying amplitude control signal involved, the chopped waveform also resembling a half-wave rectified AC waveform whose pulses vary in amplitude with the control signal and synchronized with the pulsed energizing voltage waveform. The Schmitt trigger circuit per se most advantageously has a very small hysteresis, but the signal level responsive circuit has a much greater overall hysteresis provided by a feedback circuit which increases the effective amplitude variation of the control signal after the Schmitt trigger circuit is triggered into its unstable condition.

3,648,184

FM DETECTING CIRCUIT HAVING A PIEZOELECTRIC FILTER

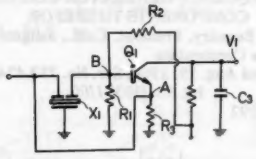
Satoru Fujishima, and Hideo Honma, both of Kyoto-fu, Japan, assignors to Murata Manufacturing Co., Ltd., Kyoto-fu, Japan

Filed Aug. 14, 1969, Ser. No. 850,099

Claims priority, application Japan, Aug. 14, 1968, 43/57854; Feb. 14, 1969, 44/11329

Int. Cl. H03d *1/00*

U.S. Cl. 329—198 **12 Claims**



An FM detecting circuit comprises a band pass filter composed of at least one piezoelectric resonator having three electrodes or a plurality of piezoelectric resonators having two electrodes and a transistor.

The output voltage of the transistor is increased or decreased in proportion to the difference between the phases of the input and output voltages of the band pass filter, whereby the phase detection of the input voltage can be achieved.

3,648,185

SEMICONDUCTOR DEVICE FOR AMPLIFYING MICROWAVES

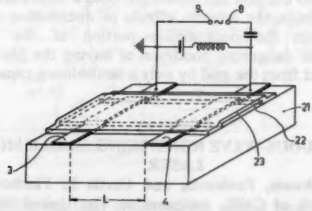
Gerard Adriaan Acket, and Marinus Teunis Vlaardingerbroek, both of Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed June 18, 1969, Ser. No. 834,280

Claims priority, application Netherlands, June 29, 1968, 6809255

Int. Cl. H03f *3/04*

U.S. Cl. 330—5 **5 Claims**



A semiconductor microwave amplifier is described with a construction to suppress the formation of travelling domains producing unwanted oscillations. The device construction includes an active epitaxial layer on a substrate, and adjoining the active layer a higher resistivity part. Contacts are provided on the active layer. The active layer is given a thickness below the length of a domain that might have formed. An advantage is that the contact spacing and dopant concentration of the active layer is much less critical.

3,648,186

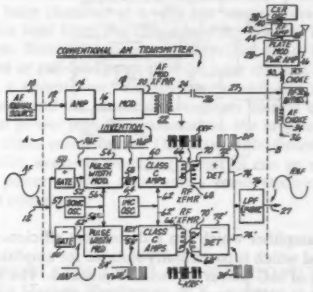
AMPLIFICATION SYSTEM

Leonard R. Kahn, Freeport, N.Y., assignor to Kahn Research Laboratories, Inc., Freeport, Long Island, N.Y.

Continuation of application Ser. No. 610,306, Jan. 19, 1967, now abandoned. This application Mar. 24, 1970, Ser. No. 22,386

Int. Cl. H03f *3/38*

U.S. Cl. 330—10 **21 Claims**



An electrical signal amplification unit wherein an audio or other low-order frequency input signal width-modulates a pulsed signal having an intermediate order repetition frequency at least twice the frequency of the low-order input frequency. The width-modulated pulsed signal is then employed to key an RF carrier wave which is then amplified in Class C amplifier stages. After pulse detection, the low-order frequency signal components are isolated and fed to a utilization circuit, such as an AM transmitter. Alternate circuits are provided for amplifying both the AC and DC components, or only the AC signal components of the input signal, and for monophase detection, or polyphase detection at high-power levels.

3,648,187

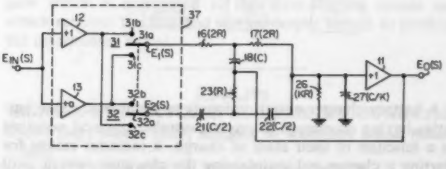
NOTCH FILTER NETWORK WITH CONTROLLABLE RESPONSE

Teddy G. Saunders, Atherton, Calif., assignor to The Vadic Corporation, Palo Alto, Calif.

Filed Aug. 24, 1970, Ser. No. 66,194

Int. Cl. H03f *3/04*

U.S. Cl. 330—21 **7 Claims**



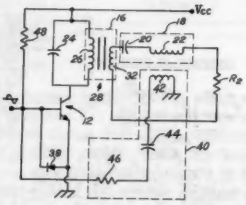
A filter network is provided which will pass a first band of frequencies and attenuate a second band of frequencies, and which is programmable to reverse its operation and attenuate the first bank of frequencies and pass the second band of

frequencies. The network includes a twin-T filter network, and a pair of amplifiers are connected between the twin-T filter and the network input. By reversing the connections of the amplifiers to the twin-T network, the pass and attenuation bands of the overall network may be reversed while the gain is maintained constant.

3,648,188
TRANSISTOR POWER AMPLIFIER

Henry K. Ratcliff, Davenport, Iowa, assignor to The Bendix Corporation

Filed June 10, 1970, Ser. No. 45,163
Int. Cl. H03f 1/38
U.S. Cl. 330—26 **10 Claims**

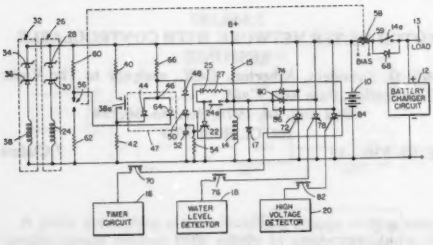


An AC amplifier which has a theoretical efficiency of 100 percent and which is particularly suitable for amplification or generation of AC power at radiofrequencies. The amplifier operates in a switching mode with a transformer being used to couple the switched DC supply through a series tuned circuit to a load connected to the secondary of the transformer. A means is also provided to insure the energy in the magnetic field of the primary is transferred without loss to the secondary circuit during pulsation of the DC supply.

3,648,189
AUTOMATIC BATTERY CHARGER CIRCUIT

John W. Marchetti, Cherry Hill, N.J., and Herbert H. Kiser, South Boro, Mass., assignors to The Budd Company, Philadelphia, Pa.

Filed Apr. 27, 1970, Ser. No. 31,899
Int. Cl. H02j 7/04
U.S. Cl. 320—39 **10 Claims**

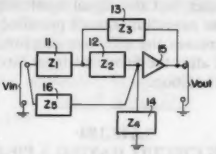


A battery charger circuit uniquely applicable to those batteries having no change in any measurable physical constant as a function of their state of charge. It includes means for starting a charge and maintaining the charging current until the battery voltage has charged to a predetermined level and the charging current has dropped below a predetermined rate. Safety features relating to charging time, liquid level and excessive charging voltage are included to prevent the battery from charging under unsafe conditions.

3,648,190
ACTIVE FILTER

Eugene J. Bruckert, Arlington Heights, Ill.

Filed Jan. 2, 1970, Ser. No. 217
Int. Cl. H03f 1/36
U.S. Cl. 330—107 **11 Claims**

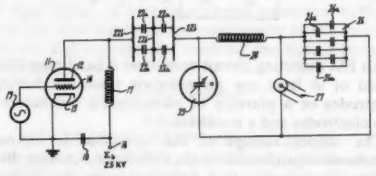


An improved high-pass or low-pass active filter section is provided by taking a standard active high-pass or low-pass filter section including an amplifier and adding thereto a single impedance between the input to the amplifier and the filter input. The addition of the single component increases the attenuation capabilities of the active filter section.

3,648,191
RADIOFREQUENCY GENERATOR CIRCUITS AND COMPONENTS THEREFOR

Harvey James Beaudry, Fremont, Calif., assignor to International Plasma Corporation

Filed Aug. 19, 1968, Ser. No. 753,474
Int. Cl. H03f 1/00
U.S. Cl. 330—192 **2 Claims**



R.F. generator circuits and components therefor including an output circuit for matching the output of the power tube to a transmission line which enables the tube to be operated at power levels below that at which the output circuit is tuned while preventing destructively high plate currents from being established under such conditions by the proper selection of capacitive and inductive components to provide current-limiting resistance in the plate circuit during detuned operation; a large air capacitor in the output circuit of the power tube having metal plates which physically shape the discharge caused by instantaneously high voltages to which the output circuit may be subjected whereby corona emissions are prevented from creating large flames which can be extremely damaging to the equipment; and a power tube grid circuit which matches, in a most unique way, a driving oscillator circuit to the grid and which provides a neutralizing circuit to eliminate the adverse effects of distributive capacitants wherein the neutralizing portion of the circuit eliminates the dangerous condition of having the plate voltage separated from the grid by only a neutralizing capacitor.

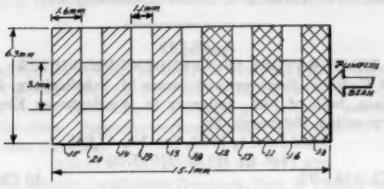
3,648,192
CONTINUOUS-WAVE NONSPIKING SINGLE MODE LASER

Milton Birnbaum, Peninsula, and Curtis L. Fincher, Torrance, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force

Filed Jan. 28, 1971, Ser. No. 110,497
Int. Cl. H01s 3/10, 3/05, 3/04
U.S. Cl. 331—94.5 **5 Claims**

A continuous-wave, nonspiking, single-mode laser is provided wherein continuous-wave, nonspiking operation of

ruby lasers cooled to 77 and 4.2°K. is obtained by end pumping a laser rod with the output of a CW argon ion laser. The



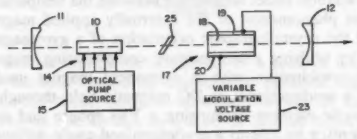
laser rod is comprised of six discs, three ruby and three sapphire separated by spacers.

3,648,193

MODE-LOCKED FREQUENCY DOUBLED LASER

Jack D. Foster, Los Altos, and Larry M. Osterink, Mountain View, both of Calif., assignors to Sylvania Electric Products Inc.

Filed July 2, 1969, Ser. No. 838,440
Int. Cl. H01s 3/10
U.S. Cl. 331—94.5 **5 Claims**



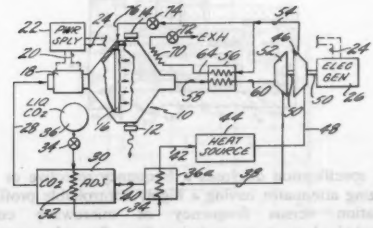
This laser comprises an intracavity nonlinear crystal that converts fundamental frequency laser light to second harmonic light and is also modulated to mode lock the laser. The modulation voltage, and thus the modulation depth, is varied to optimize the magnitude of the second harmonic power produced by the crystal.

3,648,194

SEMICLOSED CYCLE GAS LASER SYSTEM

Gorken Melikian, Springfield, Mass., and Frank R. Biancardi, Vernon, Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed Sept. 10, 1969, Ser. No. 858,566
Int. Cl. H01s 3/09, 3/22, 3/04
U.S. Cl. 331—94.5 **13 Claims**



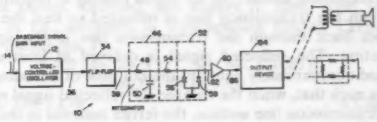
A flowing gas laser system of the mixing type removes lasing gas from the laser effluent so as to recycle the remaining gas, such as a mixture of energizing gas and relaxant gas. Fresh lasing gas is introduced into the system from a pressurized source thereof. Typically, carbon dioxide is removed from the laser effluent so as to permit reuse of a mixture of helium and nitrogen, by means of a lithium oxide or lithium hydroxide solid absorbent bed which is cooled by expanded CO_2 from the liquefied source. In one embodiment, the liquid CO_2 also precools the main gas flow prior to entrance into the CO_2 adsorber. The warmed CO_2, with or without additional external heat supplied thereto, is passed through an expander, which operates a turbine to drive a compressor used for creating flow through the system. The CO_2 which leaves the expander at temperatures of about 0° F. is then divided into two streams. One stream may be used to precool the laser effluent gases prior to reaching the compressor inlet as well as cool the laser chamber, while the other stream is used directly in the laser chamber. An excess of CO_2 may be flowed through all of the above-described processes by venting some of it to ambient, and using only part of it as the lasing gas, or a part of the CO_2 may be passed directly from the liquefied source into the laser chamber. A second embodiment employs a prime mover to drive the flow-inducing compressor, the liquid CO_2 being expanded and passed directly into the laser chamber at a very low temperature or serving to remove heat from the CO_2 adsorber, prior to its use as a lasing gas. External coolants are provided so as to cool the adsorbent or pre- and post- cool the laser effluent as it moves through a compressor, thereby maintaining the size of the compressor and the power requirements thereof quite small. Electrical power may be generated on the compressor drive shaft in either embodiment. The latter embodiment may employ readily available electrical power to run an electric excitation power supply, and even a small electric motor to drive the compressor.

3,648,195

MODULATOR USING A HARMONIC FILTER

Francis C. Marino, Huntington, N.Y., assignor to Digitronics Corporation, Albertson, N.Y.

Filed Mar. 11, 1970, Ser. No. 18,515
Int. Cl. H04l 27/12
U.S. Cl. 332—14 **13 Claims**



A modulator for producing a low-harmonic content information signal alternating between a first and a second frequency from a baseband signal alternating between a first and a second potential which comprises signal-generating means which is adapted to produce a square wave having a first frequency when the baseband signal is at the first potential and a second frequency when the baseband signal is at the second potential. Wave-shaping means receives the square wave and converts the square wave into respective first and second frequency output signals at least a portion of which varies linearly with time. Also provided is a passive device having a characteristic which includes a substantially logarithmic voltage versus current relationship over a first region which is connected to the wave-shaping means and which receives the first and second output signals to produce the information signal.

3,648,196

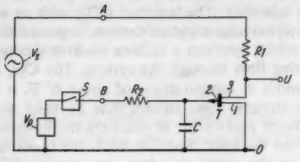
SIGNALS MODULATOR IN AUDIOMETRY APPARATUS

Guido Gay, Milan, Italy, assignor to Amplifon S.a.s., Milan, Italy

Filed Feb. 26, 1970, Ser. No. 14,613
Claims priority, application Italy, Feb. 27, 1969, 13433 A/69
Int. Cl. H03c 3/22
U.S. Cl. 332—16 T **6 Claims**

A device for the switching and/or modulation of a signal, particularly in audiometry apparatus, comprising a voltage

divider consisting of a field-effect transistor and at least one fixed resistor, the signal to be modulated being applied across



the divider and withdrawn between said transistor and said fixed resistor.

3,648,197

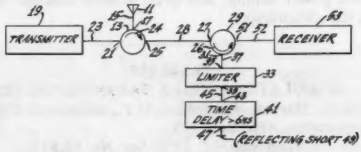
MICROWAVE LIMITER THAT SUPPRESSES LEADING EDGE SPIKE OF RADIOFREQUENCY SIGNAL

Wieslaw Wojciech Siekanowicz, Trenton, N.J., assignor to RCA Corporation

Filed June 1, 1970, Ser. No. 42,153

Int. Cl. H03g 11/04; H01p 1/32

U.S. Cl. 333—17 **8 Claims**



An RF limiter includes a section of transmission line having ferrite material so arranged therewith and biased as to act as a reciprocal limiter. An RF signal passing in one direction through the transmission line is reflected so that the signal passes back through the transmission line in the opposite direction. The reflected signal is delayed at least a time period approximately equal to the fall time of a leading edge spike such that, when the delayed RF reflected signal reaches the transmission line section, the ferrite material in the transmission line section is in its nonlinear operating condition.

3,648,198

DELAY LINES FOR MICROWAVE TUBES

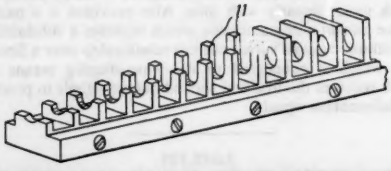
Ta Yeou, Paris, France, assignor to Thomson-CSF

Filed July 29, 1970, Ser. No. 59,086

Claims priority, application France, Aug. 4, 1969, 6926689

Int. Cl. H03h 7/30

U.S. Cl. 333—31 A **5 Claims**



Certain UHF electron tubes using the interaction between an electromagnetic wave and an electron beam comprises a delay line made up of periodic elements having an aperture for the transit of said beam, the height of said elements decreasing at the end of the delay line to match said end to the input and/or output connections. The present invention allows to avoid the interception of a certain fraction of the beam by the element part comprised between the aperture and the edge of said element, when said part, at said end of the delay line, is reduced. The improvement relates to UHF electron tubes operating in very short wavelengths.

3,648,199

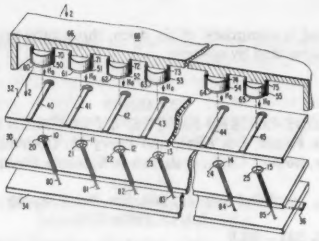
TEMPERATURE-INDEPENDENT YIG FILTER

Daniel C. Buck, Hanover, and James M. Schellenberg, Glen Burnie, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 1, 1970, Ser. No. 42,048

Int. Cl. H03h 7/10, 5/00

U.S. Cl. 333—73 **10 Claims**



A cancellation effect is obtained between the temperature-dependent phenomenon of the externally applied magnetic field and the crystallographic orientation of a gyromagnetic element by utilizing a temperature compensating magnetic shunt in combination with a permanent magnet used to establish a unidirectional or DC magnetic field through the gyromagnetic element comprising a YIG sphere and selectively orienting its axis to a predetermined angle defined by the direction of the DC magnetic field wherein the resonance frequency of the YIG sphere increases with temperature. Thus, any decrease in saturation magnetization as a function of temperature is exactly cancelled out by selective orientation of the YIG sphere.

3,648,200

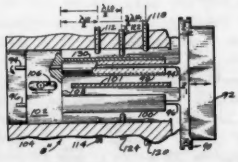
FREQUENCY SELECTIVE ATTENUATION APPARATUS

William H. Harrison, 23341 Burbank Boulevard, Woodland Hills, and Seymour B. Cohn, 5021 Palomar, Tarzana, both of Calif.

Continuation-in-part of application Ser. No. 807,632, Mar. 17, 1969. This application Sept. 22, 1969, Ser. No. 870,327

Int. Cl. H03h 7/12, 7/16

U.S. Cl. 333—73 W **8 Claims**



The specification discloses a frequency selective or gain equalizing attenuator having a highly controllable profile of attenuation versus frequency of microwave energy propagated along a transmission line. Spaced a quarter-wavelength apart, a pair of resonant stubs are coupled to the line through resistive loss elements. Depending upon the frequency of the incident energy and the length of the stubs, the coupling of the lossy elements to the line varies as the stub reactance varies from short to open and, accordingly, provides a predetermined desired attenuation characteristic. The overall discontinuities on the transmission line caused by

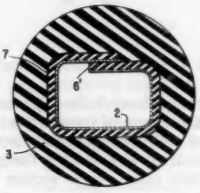
the stubs and lossy elements substantially mutually cancel each other because of their symmetry and quarter-wave spacing along the transmission line. A full reading of the specification is recommended for details of the concepts involved.

3,648,201

PLASTIC COVERED FLEXIBLE WAVEGUIDE FORMED FROM A METAL COATED DIELECTRIC LAYER

Hans Gissel, Backnang Wurttemberg, Germany, assignor to Telefunken Patentverwertungsgesellschaft m.b.H., Ulm-Donau, Germany

Filed Oct. 28, 1969, Ser. No. 871,870
Claims priority, application Germany, Nov. 8, 1968, P 18 07 718.4
Int. Cl. H01p *3/14, 11/00*
U.S. Cl. 333—95 R 11 Claims



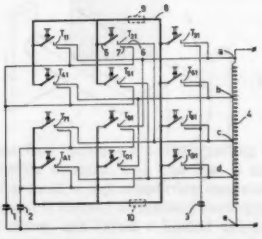
A flexible waveguide composed of a tube of noncircular cross section formed by overlapping opposite edges of a sheet, the sheet being a laminate formed of metal foil covered on one surface by a layer of flexible dielectric. The exterior of the tube is covered with additional flexible dielectric material which forms a relatively thick protective coating.

3,648,202

TRANSMITTING ARRANGEMENT FOR USE IN TONE FREQUENCY PUSHBUTTON SELECTION SYSTEMS

Jan Schalkwijk, Hilversum, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of application Ser. No. 511,046, Dec. 2, 1965, now abandoned. This application Mar. 19, 1971, Ser. No. 126,339
Claims priority, application Netherlands, Dec. 3, 1964, 6414016
Int. Cl. H03j *5/08, 5/32*
U.S. Cl. 334—47 7 Claims



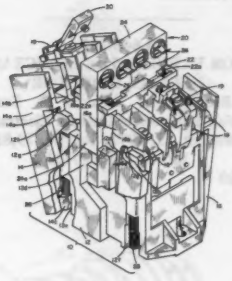
A transmitting arrangement for use in a tone frequency pushbutton selection system which by the depression of an arbitrary key a single tone frequency is produced by an oscillator coil and capacitor arrangement and depression of any two adjacent keys results in short circuiting a portion of the oscillator coil.

3,648,203

RELAY SWITCH HOUSING

Hugh Kane, Freeport, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 26, 1970, Ser. No. 66,943
Int. Cl. H01h *50/02*
U.S. Cl. 335—132 6 Claims



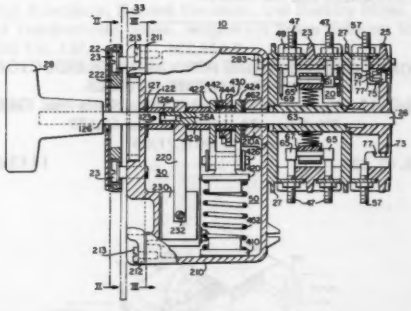
A relay switch arrangement having split housings associated with and divergently movable with respect to a base and to each other and detent means provided therebetween to allow the housings to be opened and to be maintained open against the forces tending to cause closure thereof so as to allow for ease in servicing of the magnetic frame, coil and armature-moving contact assembly of the relay switch arrangement which are encompassed by the base and the housings.

3,648,204

SWITCH HAVING MAGNETIC LATCHING MEANS

Norman Davies, Trafford, and Robert D. Binz, West View, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 29, 1971, Ser. No. 110,871
Int. Cl. H01h *9/20*
U.S. Cl. 335—170 6 Claims



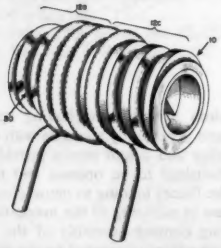
A rotary switch having separable stationary and movable contacts and a shaft which is rotatable to actuate the movable contacts between two operating positions. A spring biasing means is operatively connected to the shaft to bias the shaft toward a first position corresponding to one of the operating positions of the associated contacts. A lever is mounted on the shaft and carries a magnetic armature which

is disposed to engage a stationary magnetic structure having a permanent magnet member in a second position of the shaft which corresponds to the other operating position of the associated contacts to magnetically latch the switch contacts in the latter operating position. An electromagnetic coil is disposed on the stationary magnetic structure and is energizable to release the magnetic armature and the shaft which then actuates the associated contacts under the influence of the spring biasing means to the first-mentioned operating position of said contacts.

3,648,205
DEVICE FOR VARYING THE INDUCTANCE OF A HELICAL INDUCTOR

Raymond S. Bunch, and Richard B. Sanger, both of Lynchburg, Va., assignors to General Electric Company

Filed Oct. 12, 1970, Ser. No. 79,858
Int. Cl. H01f *21/02*
U.S. Cl. 336—20 **1 Claim**

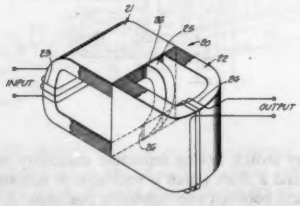


An insulating member has an external helical thread that threads inside the turns of a helical inductor. A first part of the thread provides a first spacing between turns of the inductor, and a second part of the thread provides a second, greater spacing between turns of the inductor. A nonmagnetic, conductive element is positioned inside the insulating member in the vicinity of the second part of the thread. With the first part of the thread engaging the inductor, a high value of inductance is provided. When the insulating member is rotated so that the second part of the thread engages the inductor, the increased spacing of the inductor turns and the nonmagnetic, conductive element combine to decrease the inductance of the inductor by an amount dependent upon the amount that the second part of the thread and the element are introduced into the inductor.

3,648,206
CORE CONSTRUCTIONS FOR VARIABLE INDUCTORS AND PARAMETRIC DEVICES

Cravens L. Wanlass, 9871 Overhill Drive, Santa Ana, Calif.

Filed Aug. 31, 1970, Ser. No. 68,130
Int. Cl. H01f *21/08*
U.S. Cl. 336—160 **14 Claims**



Various core constructions are disclosed for use with variable inductors and parametric devices, the cores having supplemental core pieces acting in some cases as magnetic shunts and in other cases as return paths, or both, for the input and/or output portions of a magnetic core such as that disclosed in U.S. Pat. No. 3,403,323.

3,648,207
APPARATUS FOR STARTING AND OPERATING ELECTRIC DISCHARGE LAMPS

Saverio Caltagirone, Danville, Ill., assignor to General Electric Company

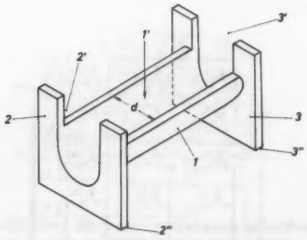
Original application Feb. 16, 1970, Ser. No. 11,454, now abandoned. Divided and this application Apr. 5, 1971, Ser. No. 131,474
Int. Cl. H01f *27/28*
U.S. Cl. 336—206 **10 Claims**

An electric discharge lamp ballast apparatus employing a high leakage reactance type of transformer with a shell-type magnetic core and with electrical coils wound of turns of generally round insulated wire which is flattened on the sides to form an essentially oblong cross section with the pair of flattened opposed sides extending in an axial direction with respect to the coil and adjacent to the layer insulation of the coil. The beginning turn or turns and the ending turn or turns of the coil not being flattened, such that they form generally round leads for the coil. Round leads for tap connections to be formed intermediate the ends of the coil are formed by a turn or turns of the coil interconnecting adjacent layers of the coil not being flattened.

3,648,208
COIL FORM

Helmut Rolf, Nurnberg, Germany, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Feb. 3, 1970, Ser. No. 8,363
Claims priority, application Germany, Feb. 26, 1969, G 69 07 606
Int. Cl. H01f *27/30*
U.S. Cl. 336—208 **1 Claim**



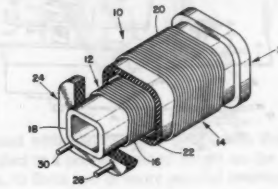
A double-flanged coil form with a hollow core part is provided with an uninterrupted slot running through the core part in axial direction and through the flanges in the radial direction. The slot is as broad as the diameter or the breadth of the core part. The coil form can be die-cast or molded as a whole, avoiding the use of slides and a put-in core.

3,648,209

INDUCTANCE DEVICE WITH VACUUM INSULATION

Channing C. Conger, Olmsted Falls, Ohio, assignor to The United States of America as represented by the Administrator of National Aeronautics and Space Administration

Filed Jan. 28, 1971, Ser. No. 110,402
Int. Cl. H01f 27/32
U.S. Cl. 336—220 5 Claims



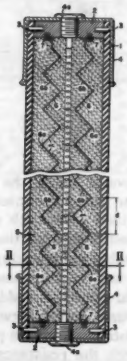
Electromagnetic components for use in space are made of materials of low gas entrapping capability. The electromagnetic components also includes electrical winding. The windings are loosely wound to provide adequate vent paths to the surface of the windings. The vacuum of space is utilized for insulation.

3,648,210

HIGH-VOLTAGE FUSE WITH SELF-SUPPORTING SPRING FUSE LINK

Frederick J. Kozacka, South Hampton, N.H., assignor to The Chase-Shawmut Company, Newburyport, Mass.

Filed Jan. 26, 1971, Ser. No. 109,779
Int. Cl. H01h 85/08, 85/12
U.S. Cl. 337—161 8 Claims



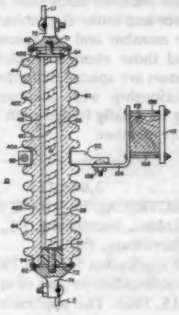
A high-voltage fuse includes a self-supporting fuse ribbon fuse link, or fusible element, i.e., one that is not provided with, or wound around, a link supporting insulating mandrel. The fusible element is formed of resilient material, preferably relatively hard silver, and forms a loaded extension spring. The fusible element is bent at a plurality of points in zigzag fashion having planar sections between bends. These planar sections enclose acute angles close to 90°. The ribbon fuse link has a plurality of serially arranged perforations and each of the aforementioned planar sections encompasses a plurality of such perforations. Each of the plurality of points where the fuse link, or fusible element, is bent is coextensive with one of said plurality of perforations thereof.

3,648,211

HIGH-VOLTAGE CURRENT LIMITING PROTECTIVE DEVICE

Wesley L. McKeithan, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 10, 1969, Ser. No. 883,951
Int. Cl. H01h 85/02, 85/48
U.S. Cl. 337—202 10 Claims



A high-voltage protective device comprising a hollow, generally cylindrical, electrically insulating member having an inner bore. A pair of terminal members is mounted on the insulating member adjacent to the opposite ends. One or more fuse links or fusible elements is disposed in the inner bore and spaced therefrom with each fuse link being connected between the associated terminal members. A finely divided or pulverulent arc quenching material substantially fills the space between each fuse link and the inner bore of the associated insulating member. A supporting means is secured to said insulating member at only one location which is axially intermediate the ends of said insulating member.

ERRATUM

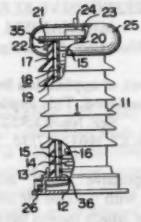
For Class 337—311 see:
Patent No. 3,648,214

3,648,212

BREAKING RESISTOR WITH COOLING MEANS

Takeo Kuwabara; Kazumi Morimoto, and Hachiro Miyao, all of Yokohama-shi, Japan, assignors to Tokyo Shibaura Electric Co., Ltd.

Filed Sept. 26, 1968, Ser. No. 762,763
Int. Cl. H01c 1/08
U.S. Cl. 338—53 11 Claims



A braking resistor is arranged to be connected to an electric power circuit when the circuit is brought into a light load state as the load becomes disconnected therefrom due to the

occurrence of a fault therein. The braking resistor comprises as the unit of a plurality of resistive elements each consisting of a conducting strip or wire wound in the form of a spiral disc, said elements belonging to at least two groups which are distinct from each other with respect to the inner and outer diameters of the elements, these element discs of, for instance, two groups being concentrically spaced in an alternate fashion and said elements being enclosed within an insulating tubular member such that those elements which have greater inner and outer diameters make sealing contact with the tubular member and are spaced from a central carrying means and those elements which have smaller inner and outer diameters are spaced from the tubular member and are sealing relationship with the central carrying means thereby defining an axially folded path for a cooling medium within the tubular member.

3,648,213

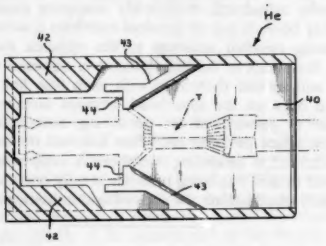
ELECTRICAL HOUSING MEMBER

Robert James Kobler, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of application Ser. No. 705,260, Jan. 26, 1968, which is a continuation-in-part of application Ser. No. 572,589, Aug. 15, 1966. This application Apr. 24, 1970, Ser. No. 31,813

Int. Cl. H01r 9/16

U.S. Cl. 339—59 R **4 Claims**



A dielectric housing for housing an electrical connector comprises a passageway in the housing in which the connector is to be disposed, the passageway providing integral lance means extending outwardly from surface means of the passageway for engagement with the electrical connector along one section thereof to prevent movement of the connector out of the passageway and the passageway and the connector providing stop means spaced from the integral lance means to limit movement of the connector in the passageway.

3,648,214

CONDITION-RESPONSIVE ELECTRIC SWITCH MECHANISM

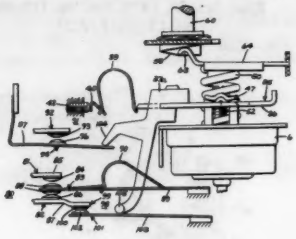
John L. Slonneger, Morrison, Ill., assignor to General Electric Company

Continuation-in-part of application Ser. No. 819,635, Apr. 28, 1969, now abandoned. This application Oct. 26, 1970, Ser. No. 83,926

Int. Cl. H01h 37/38, 37/60

U.S. Cl. 337—311 **9 Claims**

A condition-responsive snap action electric switch mechanism, for use with a room air conditioner for instance, includes an operator which moves between extreme positions in response to a bellows. The bellows pressure increases and decreases in response to changes in temperature of the air passing over the evaporator. The switch also includes a first set of contacts to control energization of the compressor and a second set of contacts, including a snap-acting arm, to control energization of the evaporator and condenser fan motor. The operator includes an operating arm having a first portion which opens and closes the first set of contacts as the operator moves through a first, snap action, increment of travel between its extreme positions. The operating arm also includes a second portion which effects snap action of the snap-acting arm to open and close the second set of contacts as the operator moves through a second increment of travel separate from the first increment of movement.



3,648,215

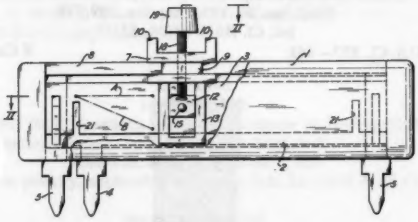
LINEAR MOTION VARIABLE RESISTOR WITH TRANSVERSE FINE ADJUSTMENT

Mogens W. Bang, Ridgway, Pa., assignor to Stackpole Carbon Company, St. Marys, Pa.

Filed Mar. 8, 1971, Ser. No. 121,896

Int. Cl. H01c 9/02

U.S. Cl. 338—122 **5 Claims**



An actuator is movable along the edges of parallel resistance and collector strips mounted in a case. The resistance strip is provided near each end with a transverse notch. Bridging contact means carried by the actuator engage both strips. Movably mounted in the actuator is an adjusting member that has an inner end connected with the contact means and that can be moved lengthwise to move the contact means forward and backward beside the strip notches to vary the distance from the point of engagement of the contact means with the resistance strip to the reduced areas of the resistance strip at the inner ends of the notches for fine adjustment of the resistor.

3,648,216

RESISTANCE ELEMENTS

Jacob Rector, 27 Palisade Road, Linden, N.J.

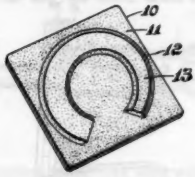
Filed Apr. 7, 1970, Ser. No. 26,332

Int. Cl. H01c 9/02

U.S. Cl. 338—142 **10 Claims**

Linear and nonlinear electrical resistance elements having base members integrally formed with ridges having plane top surfaces, the resistance material being applied to the ridges on one or more of the surfaces, the configuration of the ridges being formed to attain a predetermined resistance value and taper and the resistance material being applied to

provide one resistance track or two or more parallel resistance tracks. In an alternate form of the invention, the

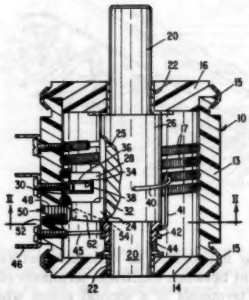


ridge is formed with one or more peaks with the resistance material applied to a predetermined height on the upward extending sides, to form two or more parallel resistance tracks.

3,648,217
POTENTIOMETER EQUIPPED WITH POSITIVE POSITIONING MEANS

Robert J. De Long, Temple City, and Paul F. Gerwitz, West Covina, both of Calif., assignors to Spectrol Electronics Corporation, City of Industry, Calif.

Continuation of application Ser. No. 741,144, June 28, 1968, now abandoned. This application May 6, 1970, Ser. No. 37,374
Int. Cl. H01c 5/00
U.S. Cl. 338—143 **3 Claims**



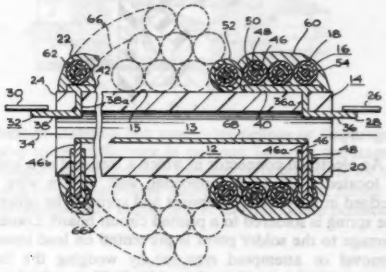
A variable resistor for regulating flow of electrical energy in an electrical circuit including a contact member with means for moving same over a resistance element wherein releasable securing means are provided for assuring a predetermined positioning of the contact member relative to the resistance element.

3,648,218
WOUND RESISTOR ARRANGEMENT

David Kellerman, 1485 South Cardiff, Los Angeles, Calif.

Filed Apr. 12, 1971, Ser. No. 133,323
Int. Cl. H01c 5/02
U.S. Cl. 338—160 **14 Claims**

A wound resistor arrangement having a very high-resistance value in a comparatively compact form is described herein. In the wound resistor, a multicoated flexible continuous body means is wound on a bobbin means. The body means comprises a substrate, which is dielectric in nature, and may comprise a dielectric filament, a dielectric tape, and electrically conductive wire coated with an inner dielectric coating, or an electrically conductive tape coated with an inner dielectric coating upon which is provided a coating of a high resistance, continuous, electrically conductive means. The high-resistance means is the resistive element for the resistor. An outer dielectric coating is provided on the outside of the high resistance, continuous, electrically conductive means for insulating adjacent turns of the body means as wound on the bobbin from each other and from adjacent layers of turns. Lead means are provided connected to each end of the high-resistance continuous electrically conductive mans and the length of the high-resistance electrically conductive means is selected to provide the desired resistance

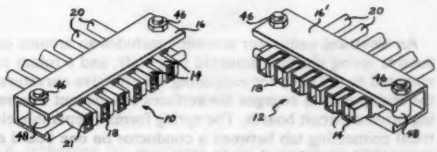


for the resistor. The invention also comprises arrangements utilizing such a wound resistor in which the resistance may be varied during utilization and, also, a coaxial arrangement in which the high-resistance, continuous, electrically conductive means is sandwiched between an electrically conductive coating deposited on the outside of the outer dielectric coating and the electrically conductive member of the substrate. Also the resistance is coated on a flexible base, the base being wound on a bobbin. A slide contact is used to form a variable resistor.

3,648,219
ELECTRICAL CONNECTOR MOUNTING RAIL AND DISCONNECTING ASSEMBLY

Wayne E. Goldman, Lexington, Mass., assignor to Anderson Power Products, Inc., Boston, Mass.

Filed Jan. 15, 1970, Ser. No. 3,015
Int. Cl. H01r 9/00, 13/62
U.S. Cl. 339—45 M **4 Claims**



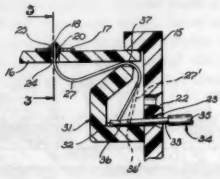
A mounting rail for mounting a plurality of uniform electrical connectors with their connecting ends in transverse alignment includes transverse locking members to engage corresponding recesses formed on the connector housing to prevent longitudinal displacement among the mounted connectors. The preferred rail is an elongated C-shaped channel member with locking lips formed on the inner surfaces of the upper and lower walls thereof, and mounting flanges may be provided at the forward or open end thereof for panel mounting. A disconnect assembly is also provided for "peeling" the longitudinally engaged banks of connectors, which preferably comprises a lever and cam apparatus.

3,648,220

ELECTRICAL CONNECTOR

Helmut Dietmar Julinot, Toronto, Ontario, Canada, assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Aug. 27, 1970, Ser. No. 67,420
Claims priority, application Canada, May 19, 1970, 083059
Int. Cl. H01r *11/20*; H05k *1/02*
U.S. Cl. 339—17 R **13 Claims**



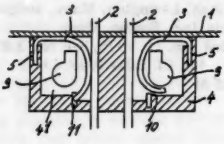
An electrical connector in which a free end of a leaf spring is located close to a supporting wall, and a wire lead is wedged in between the support and spring. The other end of the spring is soldered to a printed circuit board. Loosening or damage to the solder point is prevented on lead insertion or removal or attempted removal by wedging the free end between the lead and the board itself. The said other end of the spring has two spaced tabs which project through two holes, respectively, in the board. The tabs are tapered and take the lead insertion load without loading solder joints between the tabs and the board. The two tabs also give the spring lateral stability.

3,648,221

MULTILAYER PROGRAMMABLE WIRING BOARD

Hans Peter Tillmann, Bruxelles, and Erik Lerchs, Rhode St. Genese, both of Belgium, assignors to Burndy Corporation

Filed Mar. 12, 1970, Ser. No. 18,886
Claims priority, application Belgium, Aug. 7, 1969, 77670
Int. Cl. H01r *13/54*
U.S. Cl. 339—74 R **8 Claims**



An electrical connector assembly includes an arcuate conductive spring element mounted to a body, and a rotary cam mounted to the body for expanding the effective curvature of the spring until it engages the surfaces of adjacent intersecting printed circuit boards. The spring forms a separable electrical connecting tab between a conductor on one board and a conductor on the other. Means on the body are provided for supporting circuit boards or similar conductors in proper position relative to one or more spring elements.

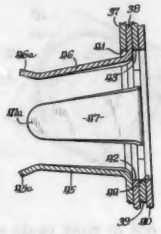
3,648,222

ELECTRICAL CONNECTOR HAVING LAMINATED CONTACT ELEMENT

Richard R. Cowmeadow, Bramalea, Ontario, Canada, assignor to The Bunker-Ramo Corporation, Oak Brook, Ill.

Filed Mar. 16, 1970, Ser. No. 19,822
Int. Cl. H01r *11/22*, *3/06*
U.S. Cl. 339—14 R **10 Claims**

Electrical connector including a plurality of thin metal plates forming a laminated contact element and formed with integral resilient tines projecting in equiangularly spaced relation from peripheral portions of aligned holes in the plates to engage contact elements which are preferably filter



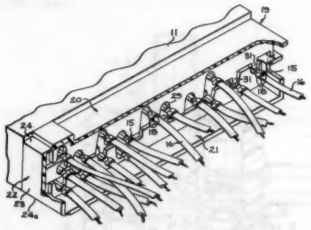
pin units, the tines and plates functioning to provide a repeatably low-impedance electrical contact and path from the outer electrodes of the filter pin units to ground.

3,648,223

LOCK COLLAR FOR MULTIPLE ELECTRICAL TERMINAL CONNECTIONS

Michael L. McCray, Fern Creek, Ky., assignor to General Electric Company

Filed Dec. 8, 1969, Ser. No. 882,924
Int. Cl. H01r *13/54*
U.S. Cl. 339—75 M **3 Claims**



A lock collar is provided to maintain electrically conductive engagement between electrical terminals of a first group and electrical terminals of a second group wherein each of the terminals of the first group is supported relative to each other as contrasted to the terminals of the second group wherein each of the terminals relies for its support upon its connection to one of the terminals of the first group. The lock collar is adapted to be positioned about and supported by the terminals of the second group. The lock collar comprises a unitary plastic structure having first and second opposing portions adapted to extend respectively above and below the electrical terminals, an integral hinge means formed at one end thereof, and an integral locking means formed at the other end thereof.

3,648,224

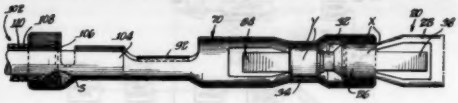
SHIELDED CABLE CONNECTOR

Cletus G. McDonough, Elmhurst, Ill., assignor to Molex Products Company, Dowers Grove, Ill.

Filed Mar. 4, 1970, Ser. No. 16,346
Int. Cl. H01r *17/06*; H01r *17/18*
U.S. Cl. 339—183 **14 Claims**

Complementary male and female connectors for shielded cables such as audio cables. Each connector is in the nature of a male or female pin terminal, respectively, and each comprises a laminated metal structure consisting of two external, rather thin sheets of conductive, resilient metal with a sheet

of plastic or the like insulating material in between. The opposite ends of each terminal are reversely bent and the terminals are so configured that each terminal can be crimped on to the end of a shielded cable simultaneously to grip both the inner conductor and the outer braid or the like shield



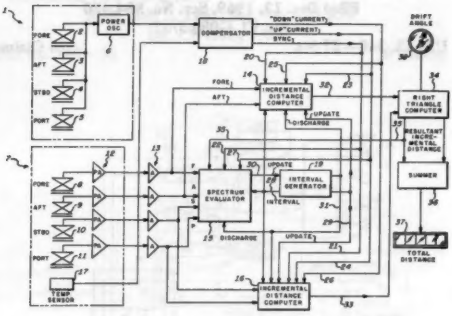
while making electrical connection therewith, but with either conductor and the shield remaining electrically isolated. The male and female terminals then are simply telescopically associated in the normal manner to effect connection respectively between two inner connectors and two external shields.

3,648,225

DIGITAL SONAR DOPPLER NAVIGATOR

Jacob A. Kritz, Westbury, and Seymour D. Lerner, Plainview, both of N.Y., assignors to Sperry Rand Corporation

Filed Dec. 4, 1969, Ser. No. 882,242
Int. Cl. G01s 9/66
U.S. Cl. 340—3 D **17 Claims**



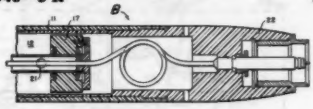
A "Janus-type" sonar Doppler navigator employs a transmitter for energizing four acoustic transducers that propagate beams in the fore, aft, port and starboard directions, respectively. Individual acoustic receivers corresponding to each of the beams supply electrical signals to a pair of incremental distance computers. The transmitter frequency and water temperature are monitored in a compensator circuit to provide corrections for variations in these quantities. The received associated signals are also applied to a spectrum evaluator for analysis of the spectral content of the received signals. Each incremental distance computer digitizes the received signals, corrects these signals in response to the output of the temperature and frequency compensator, and integrates the digitized signals throughout a time interval determined by an interval generator to provide tentative incremental distance voltages representative of the distance traveled during the corresponding time interval. If the spectral content of the received signals is satisfactory, the spectrum generator produces an UPDATE pulse that permits a readout capacitor to charge to the level of the tentative incremental distance voltage. If the spectral content is not satisfactory, the spectrum evaluator produces a RETAIN signal that permits the readout capacitor in each incremental distance computer to remain charged to the value of a previously stored signal. The voltages on the readout capacitors in both incremental distance computers are applied to further computer means for providing indications of the total distance traveled and the drift angle.

3,648,226

VIBRATION ISOLATION MODULE FOR TOWED CABLES

Hugh M. Fitzpatrick, Chevy Chase, Md.; James J. Neville, Kinnelon, N.J.; John Thompson, State College, Pa., and Fitzhugh W. Boggs, deceased, late of Hampton, N.J. (by Elizabeth M. Boggs, executrix), assignors to The United States of America as represented by the Secretary of the Navy

Filed Mar. 23, 1970, Ser. No. 21,641
Int. Cl. B63b 21/00
U.S. Cl. 340—5 R **10 Claims**



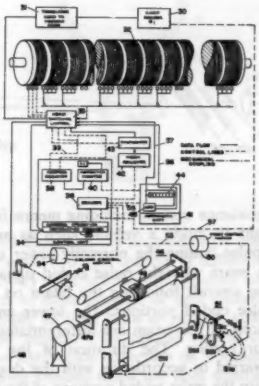
A vibration-isolation link employing pistons or diaphragms responsive to the difference in pressure between the stagnation pressure and the ambient pressure to compensate for the drag force of a towed body and employing a soft spring to maintain the piston or diaphragm in an equilibrium position.

3,648,227

CORRECTING SEISMIC TRACES FOR STATIC CORRECTIONS AND NORMAL MOVEOUT

Raymond L. Sengbush, 1209 Plattner Drive, Grand Prairie, Tex.

Continuation of application Ser. No. 329,503, Dec. 10, 1963, now abandoned. This application Oct. 25, 1966, Ser. No. 589,463
Int. Cl. G01v 1/36
U.S. Cl. 340—15.5 TD **15 Claims**

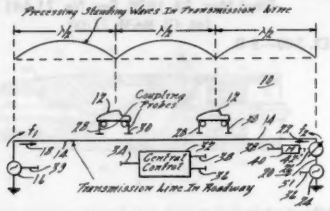


A technique for obtaining static corrections and normal moveout for a set of seismic traces. The total time shifts between all traces and a reference trace are obtained by cross-correlation. The total time shift includes the components of normal moveout, dip, and static correction. The known static corrections and the total time shifts for both end traces are combined to compute the dip and normal moveout corrections for the end traces. Dip and normal moveout for the end traces are extrapolated for dip and normal moveout for each individual trace. The static correction for each trace is obtained by subtracting the values of dip and normal moveout for each trace from the total time shift for each trace. In this manner, all of the corrections required to reduce a set of seismic traces to a common reference may be obtained.

3,648,228
CONTROL SYSTEM FOR VEHICLES

Adolphus R. Perry, Royal Oak, Mich., assignor to The Bendix Corporation

Filed Feb. 9, 1970, Ser. No. 9,768
Int. Cl. G08g 1/00
U.S. Cl. 340—23 17 Claims

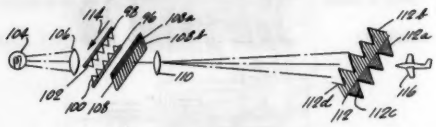


A system for controlling the spacing and velocity of a plurality of vehicles along a pathway having a signal source at each end of the pathway emitting opposing signals which superimpose so as to establish precessing nulls or characteristic value along the pathway. Each vehicle is provided with a probe to detect the nulls that it may be velocity controlled thereby.

3,648,229
PULSE CODED VEHICLE GUIDANCE SYSTEM

Alan A. Burrows, Orange, and Henry C. Lehde, Westminister, both of Calif., assignors to McDonnell Douglas Corporation

Filed Mar. 23, 1970, Ser. No. 21,820
Int. Cl. G08g 5/00
U.S. Cl. 340—26 17 Claims



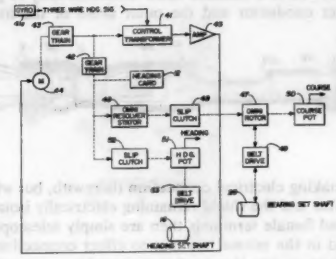
Vehicle guidance system including means for projecting a beam of light to guide a vehicle such as an aircraft, and means for pulse coding the normally lower and upper portions of the beam whereby pulse coded signals are encountered by the aircraft following the beam on any departure into the pulse coded portions. The lower and upper pulse coded portions of the beam are differentiated by frequency and/or color coding. The duration of the pulses is also preferably varied in accordance with the degree of aircraft departure into the pulse coded portions of the beam.

3,648,230
AIRCRAFT HEADING AND COURSE DISPLAY

James R. Younkin, Mineral Wells, Tex., assignor to Mitchell Industries, Inc., Mineral Wells, Tex.

Filed Sept. 8, 1969, Ser. No. 855,860
Int. Cl. B64d 43/00; G01s 1/16
U.S. Cl. 340—27 NA 13 Claims

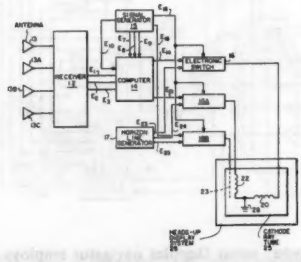
A heading card with an azimuth scale on the face thereof is mounted on a cage rotatable about the axis of the card. The cage is responsive to the output of a directional gyro for controlling the orientation of the heading card. An omnilocalizer-bearing selector and a bearing deviation indicator are mounted within the cage for the selection of a navigation bearing. A glide slope indicator is responsive to reception of a selected localizer frequency for moving into view over the face of the heading card. A number of malfunction and weak signal indicators are also selectively movable into view over the face of the heading card when required.



3,648,231
METHOD AND MEANS FOR PROVIDING A SYNTHETIC REAL WORLD RUNWAY CENTERLINE DISPLAY

Abner Owens, Jr., Paramus, and John F. Yurasek, Oakland, both of N.J., assignors to The Bendix Corporation

Filed Dec. 12, 1969, Ser. No. 884,420
Int. Cl. G08g 5/02
U.S. Cl. 340—27 NA 10 Claims



A system in an aircraft for displaying a perspective view of a synthetic runway centerline on a cathode-ray tube in a heads-up display system for guiding a pilot while landing an aircraft on the real world runway at an airport when visibility is poor. The perspective of the synthetic runway centerline changes in accordance with changes in the position of the aircraft to the runway at the airport. Beacons located at each end of the runway's centerline provide signals to a receiver in the aircraft. The receiver provides signals corresponding to the positions of the beacons. A signal generator provides deflection voltages for a synthetic runway centerline display to a computer which modifies the deflection voltages in accordance with the signals from the receiver. The cathode-ray tube provides the perspective synthetic runway centerline display in accordance with the modified deflection voltages.

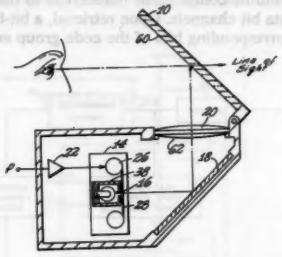
3,648,232
FLIGHT PATH DISPLAY INSTRUMENT

Alvin S. White, Marina Del Rey, Calif., assignor to Singer-General Precision, Inc.

Filed June 9, 1970, Ser. No. 44,677
Int. Cl. G08g 5/00
U.S. Cl. 340—27 R 2 Claims

An electro-optical flight instrument is provided which accepts input signals from appropriate sensors and transducers on an aircraft to provide a visual display of the pitch angle of

the aircraft, the visual display being established by means of a transparent screen positioned in the pilot's normal line of sight and focused at infinity. A servo reticle is driven in the



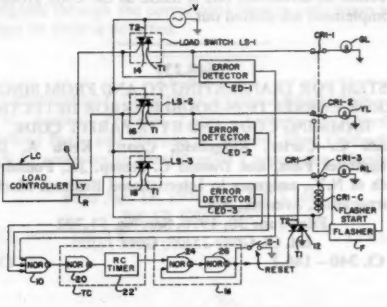
instrument and is projected at infinity upon the transparent screen, the servo reticle displaying in degrees, the angle between the aircraft and the horizon.

3,648,233

LOAD CONTROL ERROR DETECTOR

Larry K. Clark, Davenport, Iowa, assignor to Gulf & Western Industries, New York, N.Y.

Filed July 3, 1968, Ser. No. 827,079
Int. Cl. G08g 1/097
U.S. Cl. 340—46 **6 Claims**



A load control error detector system is disclosed herein for use with a load control system having at least one energizable load. An activatable switching means, such as a triac, serves upon activation by a control signal to couple the load with an alternating current voltage source for energizing the load. A load control mechanism serves to provide a control signal for activating the switching means. More particularly, the error detector circuit serves to provide an error signal whenever the load is energized without a control signal being applied to the activatable switch mechanism.

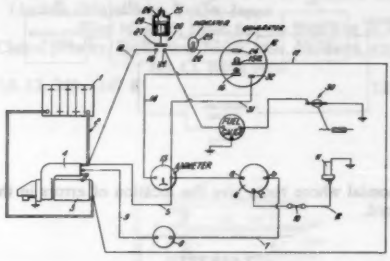
3,648,234

AUTOMATICALLY ACTUATED VEHICLE INDICATOR

Bertram C. Belford, Balsall Common, Warwickshire, Great Britain, assignor to Massey-Ferguson Services N.V., Curacao, Netherlands

Filed June 11, 1969, Ser. No. 832,260
Claims priority, application Great Britain, June 28, 1968, 30,830/68
Int. Cl. G08b 7/00
U.S. Cl. 340—62 **1 Claim**

A vehicle electrical circuit includes a battery, a generator warning lamp and a generator in series. A normally open switch in the circuit closes in response to engine oil pressure to light the lamp which is extinguished when the generator field coil voltage equals battery voltage. A fuel gauge is also



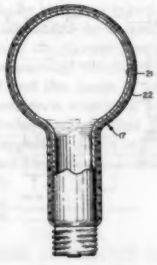
activated by the switch. This enables the electrical instruments to be automatically switched on and off by operation of the engine.

3,648,235

OPTICAL SYSTEMS

Michael R. Cahill, Bellerose, N.Y., assignor to The Marbelite Company, Inc., Brooklyn, N.Y.

Filed July 15, 1970, Ser. No. 55,060
Int. Cl. B60q 1/00
U.S. Cl. 340—110 **11 Claims**



A traffic signal apparatus for illuminating a message in alternate colors carries two light sources of different light color outputs. A one-way light mirror is positioned about one of the light sources to allow passage of light therefrom and to reflect substantially all light from an outside source such as the second light source. This optical system construction avoids unwanted light color reflection on a message plate of the housing during periods when the light source outside of the mirror is illuminated and the light source in the mirror is unlit.

3,648,236

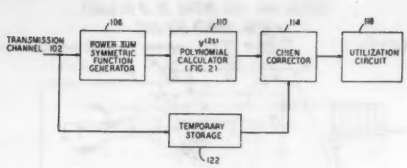
DECODING METHOD AND APPARATUS FOR BOSE-CHAUDHURI-HOCQUENGHEM CODES

Herbert O. Burton, Little Silver, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 20, 1970, Ser. No. 30,044
Int. Cl. G06f 11/00; G08c 25/00
U.S. Cl. 340—146.1 **9 Claims**

A method and apparatus are disclosed for decoding BCH codes. The disclosed method is an improvement of the so-called Berlekamp algorithm. A code word encoded in a t-error-correcting BCH code is first processed to obtain the power sum symmetric functions thereof. Utilizing these func-

tions, certain equations are recursively solved by the arithmetic operations of addition and multiplication to obtain



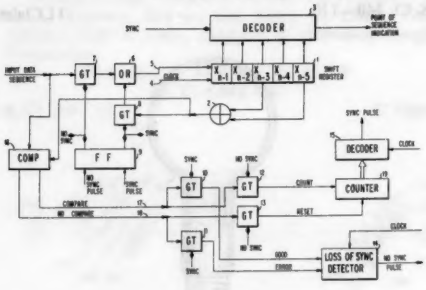
a polynomial whose roots give the location of errors in the code word.

3,648,237

APPARATUS AND METHOD FOR OBTAINING SYNCHRONIZATION OF A MAXIMUM LENGTH PSEUDORANDOM SEQUENCE

Alexander H. Frey, Jr., Gaithersburg; Burton E. Schlosburg, Takoma Park, and Ralph E. Tygielski, Derwood, all of Md., assignors to International Business Machines, Corporation, Armonk, N.Y.

Filed Feb. 28, 1969, Ser. No. 803,225
Int. Cl. H04l 7/08
U.S. Cl. 340—146.1 **7 Claims**



An apparatus and method for obtaining synchronization of a maximum length pseudorandom sequence included within input data. The apparatus comprises means for generating a predicted pseudorandom sequence, means for comparing the pseudorandom sequence with the input data and means for determining from said comparison whether said predicted pseudorandom sequence and said input data are the same. The method employed is a bit-by-bit comparison between the predicted values of a predicted pseudorandom sequence and the incoming values of the input data, synchronization is indicated when a predetermined number of successive comparisons are obtained, where said predetermined number of successive comparisons is less in number than the maximum length of the specified maximum length pseudorandom sequence.

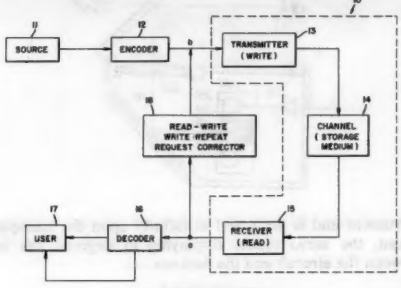
3,648,238

ERROR-CORRECTING ENCODER AND DECODER FOR ASYMMETRIC BINARY DATA CHANNELS

Alfred R. Yarrington, San Jose, Calif., assignor to Precision Instrument Company, Palo Alto, Calif.

Filed May 15, 1970, Ser. No. 37,551
Int. Cl. G08c 25/00
U.S. Cl. 340—146.1 **13 Claims**

An encoding and decoding system for detecting and correcting error bursts of nonindependent multiple errors in asymmetric binary data channels. A message group is encoded by a burst error correcting cyclic code to form a code group consisting of message bits and check bits, the check bits being the remainder after division of the message bits by the cyclic code. The code group is complemented and the code group and its complement transferred to the asymmetric binary data bit channels. Upon retrieval, a bit-by-bit comparison of corresponding bits of the code group and its com-



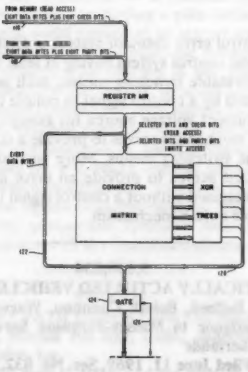
plement is used to detect an error in the retrieved data. The burst error pattern is compared with respective error syndromes in error cosets generated by division of the retrieved code group and its complement by the cyclic code group and its complement by the cyclic code to determine whether the error burst occurred in the code group or its complement. Correction of erroneous bits is made as the code group and its complement are shifted out.

3,648,239

SYSTEM FOR TRANSLATING TO AND FROM SINGLE ERROR CORRECTION-DOUBLE ERROR DETECTION HAMMING CODE AND BYTE PARITY CODE

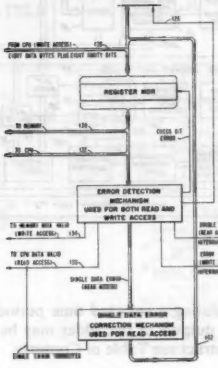
William C. Carter, Ridgefield, Conn.; Keith A. Duke, Wappinger Falls, and Donald C. Jessep, Jr., Poundridge, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1970, Ser. No. 51,302
Int. Cl. G08c 25/00; G06f 11/00
U.S. Cl. 340—146.1 **15 Claims**



An SEC/DED error detection and data translation mechanism is described. By the use of unique circuit design features, the same logical circuitry is capable of automatically taking Hamming encoded data from memory and parity

encoding same for transmission elsewhere in the system as well as forming the necessary syndromes for purposes of error detection and correction. The same circuitry is capable of receiving encoded data from elsewhere in the system, first checking for any parity error and, if parity is proper, will generate the necessary Hamming check bits for storing in the


REGISTER MDR
ERROR DETECTION MECHANISM USED FOR BOTH READ AND WRITE ACCESS
SINGLE DATA ERROR CORRECTION MECHANISM USED FOR READ ACCESS

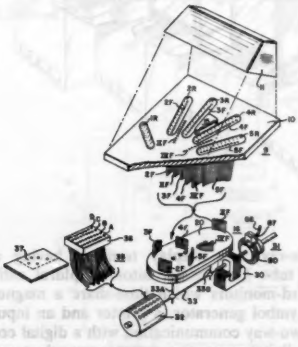
memory together with the data information. The disclosed circuitry, by means of the unique partitioning thereof, separates the error detection and correction functions. It also generates parity bits essentially in parallel with error detection after a memory read cycle with the result that the data is propagated through the correction circuitry only when a single data bit error is detected.

3,648,240

PERSONNEL IDENTIFICATION APPARATUS

Ian H. Jacoby, Franklin Lakes; Anthony J. Giordano, Midland Park, and Warren H. Fioretti, West Caldwell, all of N.J., assignors to Identification Corporation, Northvale, N.J.

Filed Jan. 15, 1970, Ser. No. 3,100
Int. Cl. G06k 9/00
U.S. Cl. 340—146.3 E **12 Claims**



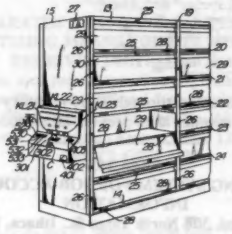
Apparatus is provided to electrooptically gauge predetermined dimensions of a human hand, circuit means are provided which automatically compare the gauged hand dimensions with the same selected hand dimensions that have been previously recorded and the person's identity is either verified or rejected.

3,648,241

STATIONARY STACK ASSEMBLY WITH REMOTELY CONTROLLED ACCESS

Han-Ichiro Naito, Akishima-shi, and Tsuneo Yamaguchi, Tokyo, both of Japan, assignors to Elecompack Company Limited, Shinjuku-ku, Tokyo, Japan

Filed Mar. 20, 1969, Ser. No. 808,930
Claims priority, application Japan, Mar. 22, 1968, 43/18577
Int. Cl. H04q 9/00
U.S. Cl. 340—147 R **12 Claims**



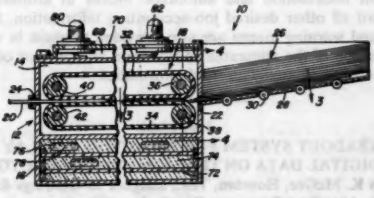
A stationary stack assembly comprising a plurality of suitably spaced stacks, which is so designed that the storage position of an article to be stored or taken out is indicated by operating keys on a keyboard in accordance with a code number representative of the storage position information or by means of a position card on which the storage position is previously memorized and the range of activity of an attendant in the stack assembly is restricted by the qualification accorded to the attendant and further the date and time when the article was stored or taken out, the attendant who handled the article and the storage position the article are recorded automatically.

3,648,242

CARD VALIDATING APPARATUS AND METHOD

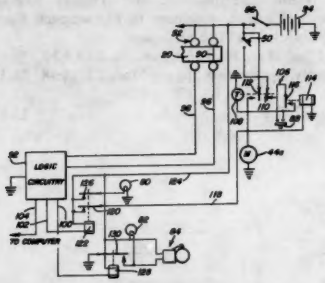
Gregory Grosbard, Long Beach, N.Y., assignor to Strategic Metals Research Inc.

Filed Oct. 23, 1968, Ser. No. 770,052
Int. Cl. H04g 3/70
U.S. Cl. 340—149 **13 Claims**



A record card internally structured in accordance with a predetermined code pattern is passed through a validating

device to verify its genuineness and/or produce readin signals for a computer. The validating device senses coded information which is processed through logic circuitry built into the device in such a manner as to prevent alteration thereof.



3,648,243

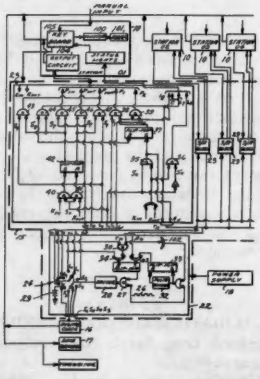
RECORDING SYSTEM FOR JOB-ACCOUNTING INFORMATION

Walter J. Wiggins, 308 North Tioga St., Ithaca, N.Y.

Filed Feb. 6, 1970, Ser. No. 9,387

Int. Cl. H04q 9/00

U.S. Cl. 340—152 **15 Claims**



An apparatus for centrally recording digital job-accounting information from a plurality of remote stations with central station control means for allowing access from only one remote station to the central station at a time, means to record manually inserted check-in, checkout and job identification information and automatic means to automatically record all other desired job-accounting information. Indicator and warning means are also provided to assist in normal operation of the apparatus and/or warn an operator of possible missing manually inserted information.

3,648,244

READOUT SYSTEM FOR SELECTIVE DISPLAY OF DIGITAL DATA ON TIME-SHARED CONDUCTORS

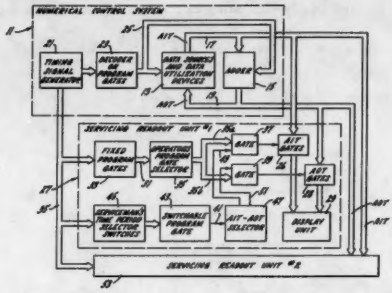
John K. McGee, Houston, Tex., assignor to Giddings & Lewis Machine Tool Company, Fon du Lac, Wis.

Continuation of application Ser. No. 618,699, Feb. 27, 1967, now abandoned. This application Jan. 26, 1970, Ser. No. 6,036

Int. Cl. G06f 3/14

U.S. Cl. 340—172.5 **18 Claims**

A two axis, digital, numerical control system for a turret lathe, using a common add-subtract unit which receives and sends information signals over a single pair of time-shared multiconductor trunk lines. A display device whereby information signaled during a selected time period and at either the inputs or the outputs of the adder may be viewed. For a more detailed abstract see Table of Contents.



3,648,245

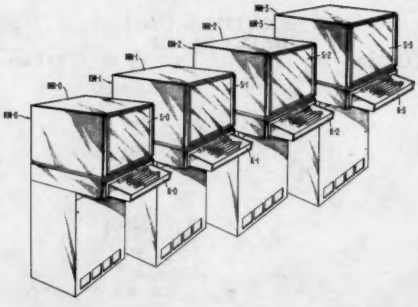
TIME-SHARED APPARATUS FOR OPERATING PLURAL DISPLAY MEDIA, AND DISPLAY METHODS INCLUDING PAGING, DISPLAYING SPECIAL FORMS AND DISPLAYING INFORMATION IN TABULATED FORM

Thomas J. Dodds, Jr., Secane, Del.; Clegg Eagleson, Philadelphia, and Harold F. Gibson, Downingtown, both of Pa., assignors to Burroughs Corporation, Detroit, Mich.

Filed Jan. 30, 1970, Ser. No. 7,055

Int. Cl. G06f 3/14

U.S. Cl. 340—172.5 **14 Claims**

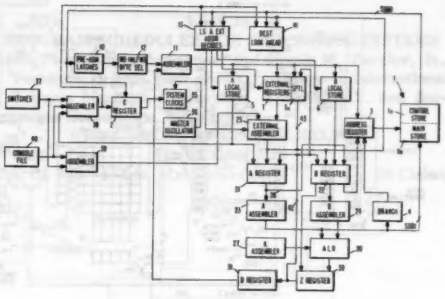


A cathode-ray tube display terminal having a single cathode-ray tube keyboard-monitor or plural cathode-ray tube keyboard-monitors which time-share a magnetic core memory, a symbol generator, a printer and an input/output section for two-way communication with a digital computing system. The digital computing system may select any one of the keyboard-monitors, or some or all of the keyboard-monitors to receive information. Methods are disclosed for displaying information in tabulated form, for transmitting and receiving information in excess of the capacity of the cathode-ray tube screen, and for displaying special forms which limit operator access to predefined areas of the cathode-ray tube screen.

3,648,246
DECIMAL ADDITION EMPLOYING TWO SEQUENTIAL PASSES THROUGH A BINARY ADDER IN ONE BASIC MACHINE CYCLE

Frank A. Zurla, Johnson City, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 16, 1970, Ser. No. 29,225
Int. Cl. G06f 7/38
U.S. Cl. 340—172.5 5 Claims

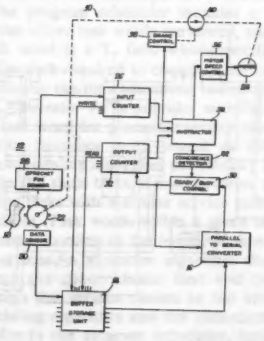


The present improvement makes use of a high-speed microprogrammed processor which has means for selecting the time duration of each basic machine cycle as the current control word is being executed. During a decimal add operation, the decimal operands are processed as normal binary values and the result is processed a second time in the binary adder to correct the result if necessary. The two ALU (arithmetic and logic unit) steps are executed during one machine cycle which is slightly longer than a normal binary add (or prior art decimal add) cycle; however, this arrangement improves overall processor performance by removing a stage of delay from the ALU input for all ALU operations. In addition, decimal error checking savings are effected.

3,648,247
DATA HANDLING SYSTEM

John Guzak, Jr., Arlington Heights, Ill., assignor to SCM Corporation, New York, N.Y.

Filed Apr. 22, 1970, Ser. No. 30,632
Int. Cl. G11c 9/00; G06f 5/04
U.S. Cl. 340—172.5 13 Claims

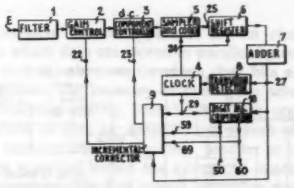


A system for transferring successive data units from a record reader to a data processor includes a buffer which is coupled between the reader and the processor and which has a plurality of individually addressable stages each adapted to store a single data unit. One counter addresses the storage elements to receive successive input data units and maintains a running count of the number, while a second counter does the same for withdrawn data units. A logic circuit controlled by the two counters establishes the difference between the number of data units supplied and withdrawn and continuously varies the speed of the record reader in an attempt to maintain the system in continuous operation. As an example, the reader speed is increased when the difference between supplied and withdrawn data units is decreased, and reader speed is decreased when the difference is increased, thereby to avoid either emptying or filling the buffer.

3,648,248
APPARATUS INCLUDING SAMPLING AND QUANTIZING MEANS FOR DISCRIMINATING RECEIVED DIGITAL SIGNALS

Pierre Deman, and Jean Pierre Gouyet, both of Paris, France, assignors to Thomson-CSF and Jean Daniel Label

Filed June 8, 1970, Ser. No. 44,045
Claims priority, application France, June 13, 1969, 6919677
Int. Cl. G06f 3/00
U.S. Cl. 340—172.5 5 Claims



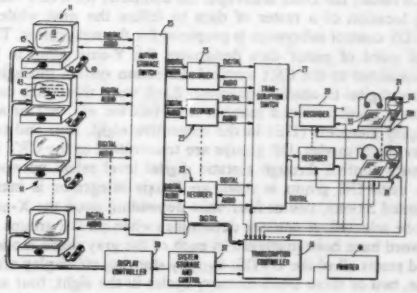
A device for processing digital pulse code modulated signals comprises means for sampling and quantizing the signal at a frequency which is a multiple of that at which the digits are transmitted. These samples are stored and summed after each sampling operation.

The result of the summing is fed to reference threshold devices to generate the requisite parameters for the control of the receiver, by means of logic circuits.

3,648,249
AUDIO-RESPONSIVE VISUAL DISPLAY SYSTEM INCORPORATING AUDIO AND DIGITAL INFORMATION SEGMENTATION AND COORDINATION

Paul E. Goldsberry, Lexington, Ky., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 8, 1970, Ser. No. 96,036
Int. Cl. G06f 7/00; G11b 11/00
U.S. Cl. 340—172.5 12 Claims



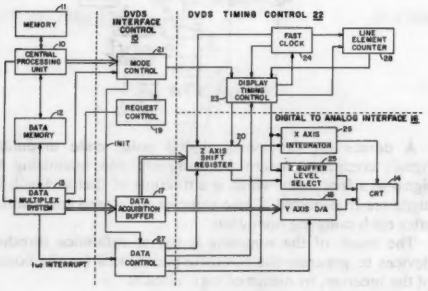
Each of a plurality of segments of dictated audio information from a plurality of remote author terminals is switched

under system control to one of a plurality of operator transcription stations for transcription of the audio information. System controls further effect the placement of transcribed information in machine readable form in system storage in proper sequence for display at the originating author terminal. System controls are facilitated by the recording of digital identification signals alongside recorded segments of audio information, the digital signals insuring proper system information identification and sequencing. Simple author controls enable selected text recall and display, text form and content modification and text highlighting. Further author controls effect audio text segmentation.

3,648,250
DIGITAL VIDEO DISPLAY SYSTEM USING CATHODE-RAY TUBE

George M. Low, Deputy Administrator of the National Aeronautics and Space Administration with respect to an invention of; Arthur I. Zygielbaum, Alhambra; Warren L. Martin, and Alexander Engel, both of LaCanada, all of Calif.

Filed Nov. 13, 1970, Ser. No. 89,209
Int. Cl. G06f *3/14*
U.S. Cl. 340—172.5 **16 Claims**

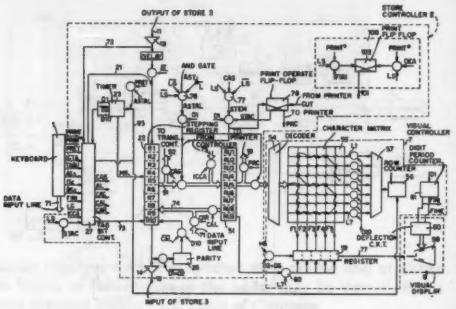


A digital video display system (DVDS) is disclosed for display of image, alphanumeric and other data on a cathode-ray tube (CRT) with sequential raster scan and two, four or eight gray shades. The DVDS includes a central processing unit for activating the system, selecting the X (horizontal axis) and Z (intensity modulation) modes, and designating the starting location of two successive rasters of data from a memory accessed by a data multiplexer subsystem (DMS). At the end of each raster, the DMS interrupts the computer for a new starting location of a raster of data to follow the next while a DVDS control subsystem is prepared for the next raster. The first word of raster data designates the Y-axis value to be transmitted to the CRT vertical deflection system through a static digital-to-analog converter. Each word thereafter contains a predetermined number *n* of bits for *n*/3, *n*/2 or *n*/1 display elements (DE) in the respective eight, four and two gray shade modes. DE groups are transmitted to the CRT intensity control through a static digital level select network. As each DE group is read, an X-axis integrator is incremented by one, two or four units depending upon the X-axis mode selected. A counter determines when all DE groups of a word have been displayed in each of the gray shade modes, and resets all of the DVDS, thereby shutting off display after one, two or three DMS-memory cycles in the eight, four and two gray shade modes, respectively, until the next word is automatically read out of memory as a separate counter in the DVDS keeps track of the DMS-memory cycles for the different gray shade modes.

3,648,251
TERMINAL APPARATUS FOR TRANSMITTING AND RECEIVING INFORMATION

Francesco Serracchioli, Banchette, and Antonio Bartocci, Ivrea, both of Italy, assignors to Ing. C. Olivetti & C.S.p.A., Ivrea (Turin), Italy

Filed Jan. 29, 1969, Ser. No. 794,870
Claims priority, application Italy, Feb., 1968, 50567-A/68
Int. Cl. G06f *3/12, 13/02*
U.S. Cl. 340—172.5 **3 Claims**

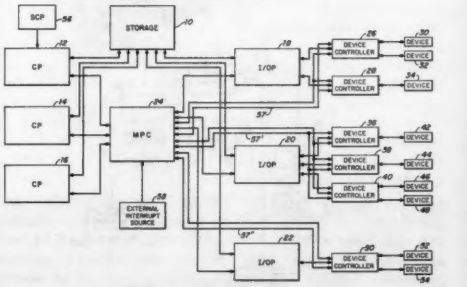


A display and printing terminal for a data processing system including a serial recirculating store for storing the information to be sent to or received from the processing system, a keyboard for entering information into the store and a display device for displaying the information in the store. A selectively actuable printing device which operates asynchronously with the store, prints out the information contained in the store. The recording of control characters at selected locations in the store allow portions of the information to be deleted during print out.

3,648,252
MULTIPROGRAMMABLE, MULTIPROCESSOR COMPUTER SYSTEM

John E. Thron, Cambridge; William E. Woods, Natick, both of Mass.; Ronald Bellettiere, Philadelphia, Pa., and Howard Stein, University Heights, Ohio, assignors to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 3, 1969, Ser. No. 873,381
Int. Cl. G06f *9/18*
U.S. Cl. 340—172.5 **10 Claims**



A multiprogrammable, multiprocessor computer system is disclosed including at least one central processor for performing arithmetic and logic operations, at least one input/output processor for performing input and output operations, storage means connected with each of the processors and adapted for storing central processor programs as-

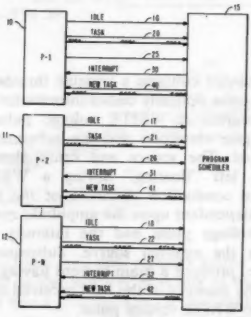
sociated with the central processor and channel programs associated with the input/output processor, and a multiprocess controller connected to each of the processors for accepting control of a program from a processor in response to an interrupt and providing control of another program to that particular processor in accordance with a predetermined priority arrangement including a plurality of activity state indicators, one associated with each of the programs in the storage means, each of the activity state indicators representing the activity state of its respective program.

3,648,253

PROGRAM SCHEDULER FOR PROCESSING SYSTEMS

Alvin P. Mullery, Chappaqua, and Frank W. Zurcher, Jr., Yorktown Heights, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y. and Burroughs Corporation, Detroit, Mich.

Filed Dec. 10, 1969, Ser. No. 883,983
Int. Cl. G06f *9/18*
U.S. Cl. 340—172.5 **40 Claims**



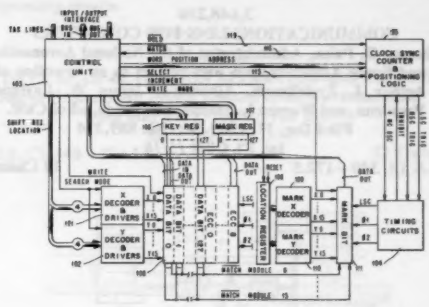
A program scheduler is provided for use with a multiprocessor system or its equivalent, such as a multiprogrammed processor unit, and the program scheduler receives tasks to be executed, schedules them for assignment, allots a task to each processor and interrupts the processors to assign new tasks. The program scheduler includes a plurality of buckets or tables where task words are stored, and associated with each task word is a T_e field which specifies the estimated processor time required to complete the task and a T_d field which indicates the time remaining before the task must be completed. The ratio T_e/T_d provides an indication of the need of each task word for processor service since the need for such service becomes more urgent as the ratio approaches 1. A scheduling algorithm periodically recalculates the service ratio and shifts tasks, if need be, from one table to another whereby tasks with a similar service ratio are stored in a common table. Task words within a given table are divided into classes according to the length of time a task has not received service. An allocation algorithm allots tasks to processors from the older classes first and proceeds in sequence through the various classes to the latest classes. Both the scheduling algorithm and the allocation algorithm service all tables in the program scheduler, but the tables with higher service ratios are serviced more often by each algorithm than tables with lower service ratios. When many task words are awaiting processor service, a given task word receives processor service at a rather low frequency when it has a small service ratio, but it receives processor service at a relatively high frequency as its service ratio approaches 1.

3,648,254

HIGH-SPEED ASSOCIATIVE MEMORY

William F. Beausoleil, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1969, Ser. No. 889,434
Int. Cl. G06f *7/34*
U.S. Cl. 340—172.5 **16 Claims**



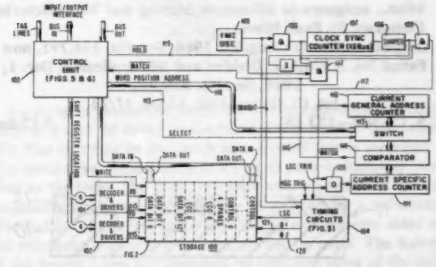
An associative search apparatus for an electronic bulk storage in which data are stored in parallel by word in a plurality of memory elements in which data bits are electronically rotatable. The memory elements are selectable by a memory selection matrix. Search tables are organized on a modular basis so that the simultaneous search of many table entries is accomplished at one time. Smaller or larger logical entries are searched within the system by executing several search operations. The first search operation marks the location of where word match conditions occurred in the first table search. The second search operation compares the second search argument against the second table only at the same relative positions where matches occurred in the first table. Marking enables any table regardless of size to be searched by using the results of a previous search operation to determine the entries to be searched on subsequent search operations.

3,648,255

AUXILIARY STORAGE APPARATUS

William F. Beausoleil, Poughkeepsie, N.Y.; Fred A. Ordemann, Jr., San Jose, Calif.; Wilbur D. Pricer, Poughkeepsie, N.Y., and Norbert G. Vogl, Jr., Essex Junction, Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1969, Ser. No. 889,435
Int. Cl. G06f *7/34*
U.S. Cl. 340—172.5 **34 Claims**



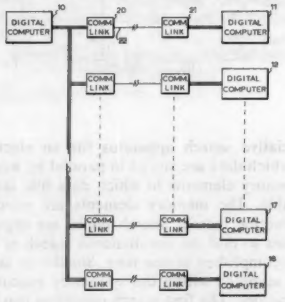
An electronic bulk storage having the characteristics of a sequential access storage device, such as a disk or a drum,

but which has a low-access time and a variable instantaneous data rate. Data re stored parallel by word in a plurality of electronically rotatable memory elements selectable by a memory selection matrix. Each element has a feedback loop for recirculating data and when selected, a group of elements is read or written in parallel to a word at a time by electronically rotating the selected memory elements.

3,648,256
COMMUNICATIONS LINK FOR COMPUTERS

Thomas O. Paine, Administrator of the National Aeronautics and Space Administration with respect to an invention of; Arthur I. Zygielbaum, Alhambra; James W. Layland, Pasadena, and Warren L. Martin, LaCanada, all of Calif.

Filed Dec. 31, 1969, Ser. No. 889,374
Int. Cl. G06f *15/16*
U.S. Cl. 340—172.5 **17 Claims**

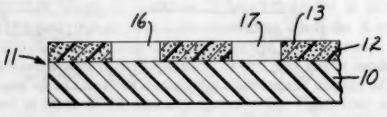


A system is disclosed for a computer to communicate with a selected one of a plurality of other computers through two identical communications links associated with the communicating computers. A single channel connects the two links which operate at a clock rate independent of the computers. Binary digits and clock pulses are combined and converted into a three-level signal for serial transmission over the single channel. Both control messages and data words may be transmitted. Each message and word transmitted is checked for error by the receiving link before it is accepted and the receiving computer is interrupted. If error is found, an error message is automatically transmitted to the originating computer.

3,648,257
SHEETLIKE MATERIAL, THE METHOD OF STORING AN IMAGE CONSISTING OF DIFFERING MAGNETIC, ELECTRICAL, AND OPTICAL PROPERTIES

Joseph A. Wiese, Jr., and William B. Barte, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Original application Aug. 24, 1966, Ser. No. 574,791, now Patent No. 3,526,542. Divided and this application Dec. 1, 1969, Ser. No. 879,952
Int. Cl. G11c *13/02*, *13/04*, *11/14*
U.S. Cl. 340—173 LS **9 Claims**

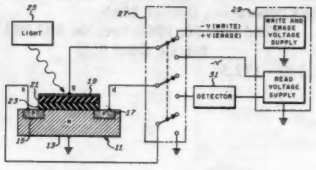


Methods of recordation, development, and readout of information from a sheetlike storage medium having an imaging layer which includes a homogeneous mixture of a halogen-containing binder and alpha ferric oxide. The medium is recorded with an information-modulated high-energy beam, developed with heat, and read out by detecting changes in the field created by exposing the medium to a uniform field of electromagnetic energy.

3,648,258
OPTICAL MEMORY CIRCUIT

Frank A. Sewell, Jr., Newton Centre, Mass., assignor to Sperry Rand Corporation

Filed July 1, 1969, Ser. No. 838,279
Int. Cl. G11c *11/42*, *13/04*
U.S. Cl. 340—173 LS **9 Claims**

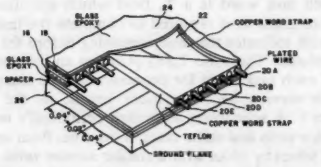


A memory circuit contains a variable threshold transistor arranged to receive optically coded information from an external light source. A WRITE voltage pulse is applied between the gate electrode and the substrate during the WRITE interval. The source and drain elements of the transistor are left "floating" during a WRITE interval whereupon the conduction threshold of the transistor assumes a level dependent upon the amplitude and duration of the WRITE voltage pulse and the intensity of the light received from the external source. Subsequently applied READ voltages produce a drain current having a magnitude indicative of the intensity of the light received during the occurrence of the WRITE voltage pulse.

3,648,259
PLATED WIRE MEMORY

Robert D. Fisher, and Ernest W. Jones, both of Woodstock, N.Y., assignors to Ferroxcube Corporation, Saugerties, N.Y.

Filed June 22, 1970, Ser. No. 48,158
Int. Cl. G11c *5/04*, *11/04*, *11/14*
U.S. Cl. 340—174 PW **8 Claims**



A noise-reduction scheme in a plated wire memory array contemplates the use of a nonswitchable noise-cancelling wire made of magnetically coated beryllium copper and placed coplanar and on the same center-to-center spacing as the remainder of the switchable wire array. The magnetic proximity loading effect of the noise-cancellation wire is equivalent to the effect of the magnetically coated plated wire and thus interposition of the noise cancellation wire on an equivalent geometric spacing with the array does not create a magnetic anomoly.

3,648,260

MAGNETIC DEVICES

Ernst M. Gyorgy, Madison; Richard C. Sherwood, New Providence, and Le Grand G. Van Uitert, Morris Township, all of Morris County, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Nov. 17, 1969, Ser. No. 877,369
Int. Cl. G11b 5/62
U.S. Cl. 340—174 TF 4 Claims

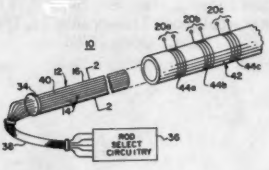
Partial substitution of small amounts of cobalt may result in a reduction in size of "bubble" magnetic domains in a variety of canted antiferromagnetic materials exemplified by rare earth orthoferrites. The reduction in domain size is ordinarily accomplished by virtue of a shift in the magnetic reorientation temperature, permitting improved device operation in this temperature region.

3,648,261

MAGNETIC ROD READ ONLY MEMORY

Cebern B. Trimble, Dayton, Ohio, assignor to The National Cash Register Company, Dayton, Ohio

Filed May 18, 1970, Ser. No. 38,458
Int. Cl. G11c 17/00, 11/04
U.S. Cl. 340—174 SP 10 Claims



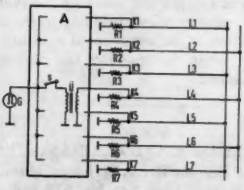
A row by column read only memory matrix utilizes etched magnetic rods as the memory elements of the matrix. Each rod is divided into a given number of equilength ordered sections and the rods are positioned so that corresponding sections of each rod are in alignment. In this manner the rods form the rows of the matrix and the aligned sections from the columns of the matrix. A coil is wound around each row of the matrix. Various circuits are shown by which the read only memory can be operated with either a parallel output or a serial output.

3,648,262

MEMORY ARRANGEMENT

Hermann Kadow, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed June 25, 1969, Ser. No. 836,496
Claims priority, application Germany, July 3, 1968, P 17 74 500.5
Int. Cl. G11c 7/00, 11/06
U.S. Cl. 340—174 M 6 Claims



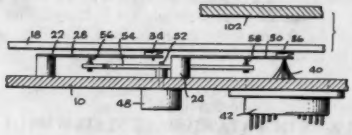
A memory system having a plurality of control lines, to individual lines of which impulses from a source of constant current may be selectively applied, each line being provided with inductive feed, and having a termination at the feed end thereof at least corresponding approximately with its wave resistance, the other ends of the parallel control lines being interconnected at least in groups with return flow being effected over other of associated lines whereby such connecting points are not led to a ground or other specific return line to improve the characteristics of the control lines as wave conductors and shorten the buildup processes associated with the return current, and thereby achieve an increase in operating speeds.

3,648,263

DATA HEAD ACTUATION APPARATUS AND CIRCUIT

George H. Kunstadt, 19005 Ventura Blvd., Tarzana, Calif.

Filed May 11, 1970, Ser. No. 35,985
Int. Cl. G11b 21/04
U.S. Cl. 340—174.1 E 12 Claims



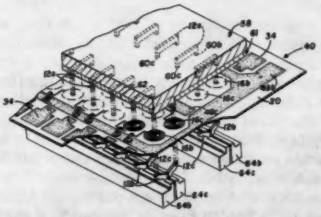
Magnetic discs and drums are employed as computer memories and have data heads aerodynamically supported on the boundary air layer as the memory medium rotates. The data heads are mounted on leaf springs and are lifted from the magnetic surface when the magnetic medium is stopped. The data heads are driven toward the surface into an aerodynamic lift relationship adjacent the moving magnetic surface as the surface approaches top speed. The data head driver is a solenoid which receives increased energization in the last stages of magnetic medium drive motor speed increase.

3,648,264

MAGNETIC HEAD WITH PRINTED CIRCUIT COIL

Norman P. Gruczelak, King of Prussia, Pa., and Joe T. Pierce, Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Sept. 30, 1968, Ser. No. 763,751
Int. Cl. G11b 5/20, 5/42
U.S. Cl. 340—174.1 F 1 Claim



An array of read-write heads for a magnetic storage means, such as a disk or drum, is disclosed. Each head is comprised of a flux carrying means, such as a gapped ferrite loop and a flux-producing means, such as a pair of coils inductively coupled to the loop. The coils, together with a portion of the associated addressing circuitry, are supported by a substrate. The halves of the ferrite loops that lie on opposite sides of the substrate are formed as separate ferrite parts. The halves of the ferrite loops are disposed on opposite sides of the coil assembly so that the halves of the loops mate through holes in the substrate and form the gapped ferrite loops.

In one embodiment, the halves of the ferrite loops are partially formed on the faces of ferrite blocks which support the

loop halves during fabrication. After the halves are assembled on opposite sides of the substrate, the excess material of the ferrite assemblies is cut away to leave the discrete ferrite loops and the associated coils embedded within a solid structure which also appropriately isolates the parts electrically and magnetically.

In another embodiment, the halves of the ferrite loops are formed individually and supported by a ceramic housing during mating with the coil assembly and the other halves of the loops.

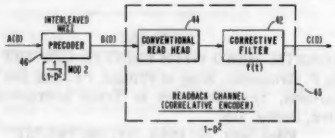
The substrate can be an insulator, such as glass, in which case the coil circuitry can be a photographically patterned metal film and the addressing diodes discrete semiconductor devices. Or the substrate can be a semiconductor, in which case either the coils or the addressing diodes, or both, may be diffused in the sheet of semiconductor material. Or the substrate may be a selectably reducible material such as YIG or TiO_2 in which conductive paths can be selectively formed in the substrate by a scanned energy beam. Or the substrate may be the face of a subassembly for holding either of the halves of the ferrite loops prior to final assembly, or coils may be formed on the faces of both subassemblies.

3,648,265

MAGNETIC DATA STORAGE SYSTEM WITH INTERLEAVED NRZI CODING

Hisashi Kobayashi, West Los Angeles, Calif., and Donald T. Tang, Yorktown Heights, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 30, 1969, Ser. No. 889,051
Int. Cl. G11b *5/06*; H03k *13/00*, *13/24*
U.S. Cl. 340—174.1 G **2 Claims**



A digital magnetic recording system which uses conventional NRZI coding and a readback channel of conventional design operates, in effect, as a precoding and correlative level coding process that is characterized by a transfer function of 1-D (where "D" is a delay operator). Under these conditions, the minimum spacing that can be permitted between adjacent digit symbols in the magnetic recording medium without incurring excessive intersymbol interference during readback is rather large and severely limits the recording density. The present invention uses interleaved NRZI coding and a special filter in the readback channel to provide a precoding and correlative level coding scheme characterized by a transfer function $1\text{-}D^2$. This mode of operation permits much denser packing of the data in the recording medium without causing excessive intersymbol interference during readback.

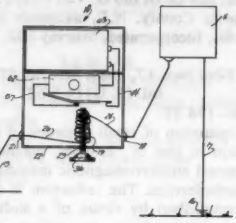
3,648,266

ELECTRIC FENCE SHORT DETECTOR

Vernon W. Crist, Wessington Springs, S. Dak.

Filed Apr. 17, 1970, Ser. No. 29,591
Int. Cl. G08b *21/00*
U.S. Cl. 340—254 **5 Claims**

An apparatus to be used in conjunction with an electric fence, whereby when the fence is shorted, a current impulse is provided in a coil in the apparatus which causes a core to be magnetized to attract an armature, thus completing an internal circuit and activating an indicator device.

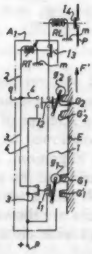


3,648,267

METHOD OF DETECTION OF THE SPEED OF A MOVING BODY IN EXCESS OF A REFERENCE SPEED, AND THE CORRESPONDING APPARATUS

Jean Lavarenne, Villecresnes, France, assignor to Nord-Aviation Societe Nationale de Constructions Aeronautiques, Paris, France

Filed June 12, 1969, Ser. No. 832,787
Claims priority, application France, June 14, 1968, 155124
Int. Cl. G08b *21/00*
U.S. Cl. 340—263 **7 Claims**



The present invention relates to a method of detection of the speed of a moving body in excess of a predetermined reference speed, the said moving body being displaced with respect to a fixed reference. It also concerns an apparatus for carrying into effect the above method, especially applicable to the control of the speed of members of automatic flight apparatus for aircraft.

The stopping of the said moving body is effected by the change in state of a circuit capable of assuming the two states, interrupted or established, and that the said change in state is caused by simultaneously bringing to the closed condition, three detectors of the interrupted or established state of a single circuit, when the speed of the moving body exceeds the limiting speed.

3,648,268

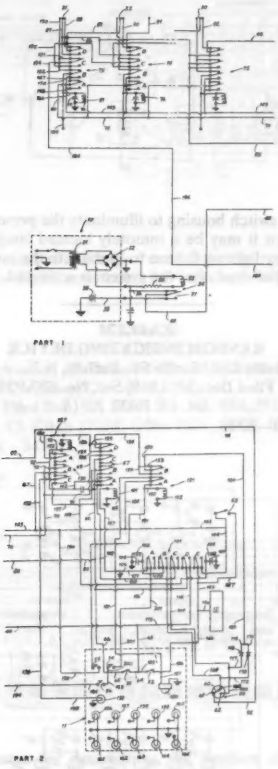
SURVEILLANCE AND ALARM SYSTEM

Melvin Paull, 8001 Rosiline Drive, St. Louis, Mo.

Filed Nov. 3, 1969, Ser. No. 873,468
Int. Cl. G08b *13/22*
U.S. Cl. 340—276 **43 Claims**

A surveillance and alarm system having a plurality of entry responsive means for detecting entry into predetermined locations throughout a building, and indicating means for

maintaining surveillance on the building and for indicating the number and locations of entries into the locations. Means are also provided for maintaining a closed series loop circuit between entry responsive means and for indicating any interruption in signal in the series loop circuit. The system further includes an external signalling device responsive to an entry or an interruption in signal, and means for selecting any one of several system mode variations.



3,648,269

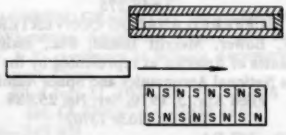
MAGNETIC FLUID DISPLAY DEVICE

Ronald E. Rosenweig, Lexington, Mass.; Joseph Resnick, deceased, late of New York, N.Y.; Louis Berger, executor; Harry Resnick, executor, and Peter Messina, executor, all of Ellenville, N.Y., assignors to Ferrofluidics Corporation, Burlington, Mass.

Filed July 16, 1970, Ser. No. 55,392

Int. Cl. G08b 5/22

U.S. Cl. 340—373 **21 Claims**



An immiscible, transparent fluid and an opaque magnetic fluid are contained within a defined volume, such as a sandwich-type construction having a transparent face through which an optical display may be observed. The transparent fluid preferentially wets the wall and results in complete displacement of opaque fluid when the fluids are moved one to the other. A magnetic field captures the magnetic fluid in a predetermined optical pattern. The optical pattern is controlled by varying the intensity and location of the magnetic field to produce various patterns.

3,648,270

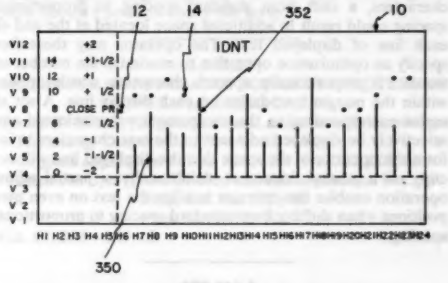
GRAPHIC DISPLAY SYSTEM

Robert Lee Metz, Nichols, and Carl Greenblum, Stamford, both of Conn., assignors to The Bunker-Ramo Corporation, Stamford, Conn.

Filed Aug. 11, 1969, Ser. No. 848,901

Int. Cl. G06f 3/14

U.S. Cl. 340—324 A **35 Claims**



A graphic display system including separate means for storing a representation of a value to be graphically displayed and a reference value which is less than the value representation. The reference value is incremented in steps of predetermined amounts and compared with the stored representation. When a match is detected, a predetermined change is caused in the display on a display device. This change may be the generating of a dot on the display, the initiating of a line, the terminating of a line, or the like.

3,648,271

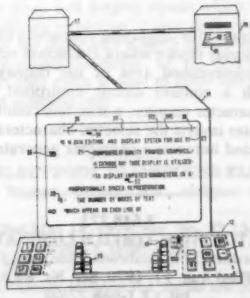
VISUAL EDITING SYSTEM INCORPORATING SELECTABLE LETTER SPACING DISPLAY AND ASSOCIATED SCALE DISPLAY

Robert L. McConnell, and Jack W. Simpson, both of Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 2, 1970, Ser. No. 15,793

Int. Cl. G06f 3/14

U.S. Cl. 340—324 A **8 Claims**



A data composing, editing, formatting and display system for use by composers of business documents and quality

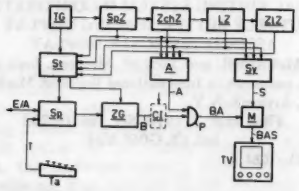
printed graphics. A cathode-ray tube display is utilized to display text characters imputed by a secondary media reader in a manner analogous to a display of a page of typed data on a typewriter. The number of words of text which appear on each line of displayed text between margin boundaries are optimized. Additional text may be inserted or deleted at any point in the displayed text or the margin boundaries can be altered resulting in the displayed text shifting to accommodate the additional text or new boundaries. Text shifting results in reoptimization of the displayed lines without resultant loss of word integrity or paragraph definition. Operator controls are actuable to effect display of the displayed characters in either standard spacing or in proportional spacing. When standard spacing is specified, each character has the same escapement value. When proportional spacing is specified, the escapement value of the character varies in accordance with the character width. Since the average character width in proportional spacing is less than the average character width of standard spacing characters, a shift from standard spacing to proportional spacing could result in additional space located at the end of each line of displayed text. The operator may thereafter specify an optimization operation to maximize the number of words of proportionally spaced characters which appear within the margin boundaries on each display line. A set of scales corresponding to the escapement value selected can selectively be displayed adjacent to the text characters to inform the operator of the space that the displayed line will occupy on a printed document. Additionally, a partial adjust operation enables the operator to align the text on even pica positions when shifting from standard spacing to proportional spacing.

3,648,272

ARRANGEMENT FOR PROPORTIONING ACTIVELY OR PASSIVELY LIGHT-RADIATING SURFACES

Jurgen Schroder, Hamburg, and Hans Georg Nussbaum, Bremen, both of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 17, 1970, Ser. No. 20,371
Claims priority, application Germany, Mar. 22, 1969, P 19 14 764.9
Int. Cl. G06f *3/14*
U.S. Cl. 340—324 A **8 Claims**



An arrangement for displaying characters or symbols on a screen of a display device where characters selected by comparing a predetermined area of the displays stored in a memory with a counter circuit controlled by a column counter, a character counter, a scan line counter and a reading line counter inverts the selected characters in an inverter stage connected between a character generator and the display device.

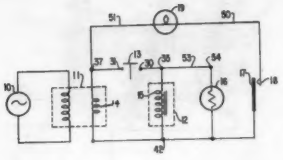
3,648,273

ANNUNCIATOR WITH TIMED ILLUMINATION MEANS

Donald J. Gardner, 3741 Penbrook Lane #13, Flint, Mich.

Filed Aug. 17, 1970, Ser. No. 64,344
Int. Cl. G08b *27/00*
U.S. Cl. 340—326 **10 Claims**

An annunciator control system is provided having a momentary-on pushbutton switch to activate a doorbell, chimes or other audio signal means and a delay means to provide electric current to an illuminating device for a predetermined period of time after the switch is depressed. The illuminating means may be an ordinary incandescent lamp located in the



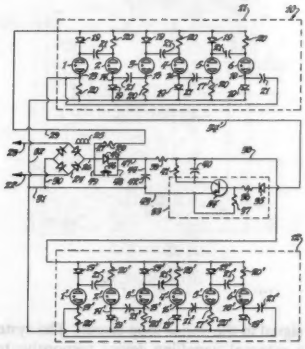
pushbutton switch housing to illuminate the person activating the device or it may be a remotely located lamp such as an entrance way lighting fixture to illuminate the entrance for a fixed period of time after the system is activated.

3,648,274

RANDOM INDICATING DEVICE

Donald T. Roth, 250 Marilla St., Buffalo, N.Y.

Filed Dec. 24, 1969, Ser. No. 887,938
Int. Cl. H03k *23/18*
U.S. Cl. 340—332 **5 Claims**



A random indicating device consisting of first and second ring counter circuits each having a plurality of lamps therein which will ignite in sequence, a full wave rectifier for converting alternating current into the pulses for effecting sequential ignition of the lamps in the first ring counter circuit, a carry circuit for effecting sequential ignition of each of the lamps in the second counter circuit upon completion of an entire cycle of ignition of all of the lamps of the first circuit, and a switch arrangement for stopping each of the circuits upon the actuation of the switch, thereby to obtain a random selection.

3,648,275

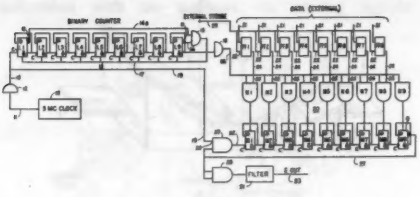
BUFFERED ANALOG CONVERTER

Kenneth F. Bower, Merritt Island, Fla., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration

Filed Apr. 3, 1970, Ser. No. 25,488
Int. Cl. H03r *13/02*
U.S. Cl. 340—347 DA **2 Claims**

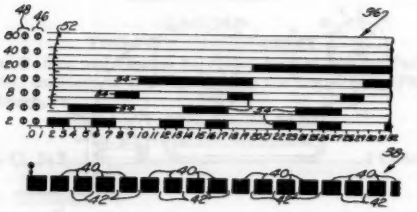
A converter for converting a binary digital code into an analog representation. The converter includes a timing system which is operated by a clock signal to produce a synchronized timing pulse. The digital information is fed into a holding register, and such is gated through a plurality of

gates that feeds the complement of the digital code into a counter. The relative duration of the output signal of the last



state of the counter in a logic "one" state corresponds to the weight of the digital code being fed into the holding register.

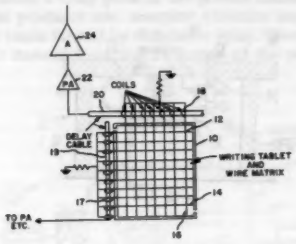
3,648,276
SEGMENTED SCALE
Ralph H. Schuman, Cleveland, Ohio, assignor to The Warner & Swasey Company, Cleveland, Ohio
Filed Dec. 11, 1969, Ser. No. 884,292
Int. Cl. G01b *11/04;* **G08c** *9/06;* **H03k** *13/02*
U.S. Cl. 340—347 A **15 Claims**



An apparatus for determining the position of one part, such as a movable operating head of a machine tool, relative to a reference position on another part, such as a base of the machine tool, includes an improved scale assembly on one part of the machine tool. This scale assembly includes a plurality of identical scale segments which are spaced apart and independently adjusted relative to a standard, such as a laser interferometer, so that any error in the positioning of one scale segment does not affect the other scale segments. A relatively coarse scale is associated with the plurality of identical scale segments to provide a unique representation for each of the identical scale segments. Suitable control circuitry switches between leading and lagging signal generators in a reading assembly mounted on the other part of the machine tool to avoid activating signal generators at transitions between scale segments.

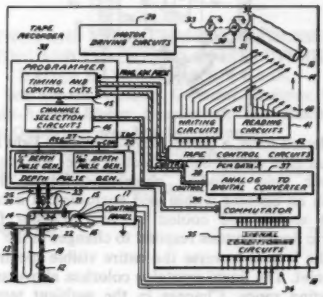
3,648,277
MAGNETIC GRAPHICAL DATA DEVICE
Albert L. Whetstone, Southport, Conn., and Samuel Fine, New City, N.Y., assignors to Science Accessories Corporation, Southport, Conn.
Filed July 21, 1970, Ser. No. 56,868
Int. Cl. G06g *7/04;* **H03k** *13/02*
U.S. Cl. 340—347 AD **8 Claims**

A coordinate digitizing device is provided with a localized source of magnetic energy positioned with respect to a wire array, each of said wires terminated in a common delay line. The magnetic energy is pulsed at a desired point, initiating a digitization time interval required for a pulse appearing along a wire of the array to traverse the delay line and reach a device for terminating digitization, and is an indication of the



relative digital magnitude representative of the magnetic pulse device's position above the array.

3,648,278
METHODS AND APPARATUS FOR USE IN PROCESSING WELL LOGGING DATA
Gerald K. Miller, Ridgefield, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.
Original application Feb. 6, 1968, Ser. No. 703,428, now Patent No. 3,457,544. Divided and this application Dec. 30, 1968, Ser. No. 787,683
Int. Cl. H03k *13/16*
U.S. Cl. 340—347 AD **11 Claims**

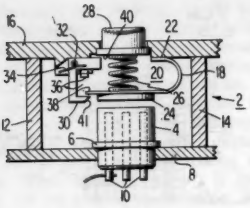


In accordance with an illustrative embodiment of the invention, a variable duty cycle analog-to-digital converter for use with well logging magnetic tape recording apparatus is disclosed. For those well logging signals which require a high degree of amplitude resolution, a long duty cycle is used. On the other hand, for those well logging signals which require a high degree of depth resolution, as, for example, dipmeter signals, a short duty cycle is used to allow the tape recorder to utilize a fast sampling rate.

3,648,279
MULTIELECTRODE TRANSDUCER ELEMENT
James Power Watson, Jupiter, Fla., assignor to RCA Corporation
Filed May 14, 1970, Ser. No. 37,124
Int. Cl. G08c *19/00*
U.S. Cl. 340—365 **9 Claims**

A transducer means suitable for use as the mechanical-to-electrical translating element of the key of a keyboard. It includes a plurality of electrodes embedded in a body of amorphous, piezoelectric material. When the key is actuated

to strike the body, a voltage is induced at each electrode. The electrodes of the various keys may be connected in different ways to common buses to provide a coded output from the keyboard.



3,648,280

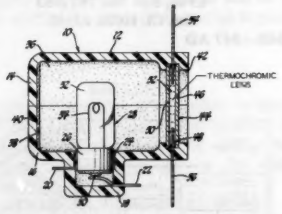
THERMOCHROMIC LIGHT-FLASHING SYSTEM

James W. Jacobs, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed May 15, 1970, Ser. No. 37,663

Int. Cl. G08b 5/00

U.S. Cl. 340—366 **2 Claims**



In preferred form, a flasher device having a light source in an opaque case with a light-reflective inner surface. A thermochromic lens including cholesteric liquid crystals is located in an opening within said enclosure. It is heated by the light source and cooled by heat transfer fins. The cholesteric liquid crystals respond to changes in the temperature of the lens to traverse the entire visible spectrum from red to violet. The liquid crystal is colorless above and below its operating range. Changes in the ambient temperature around the enclosure and the changes in the color of the crystals will vary the temperature of the thermochromic lens to produce a repetitive flashing color play effect.

3,648,281

ELECTROSTATIC DISPLAY PANEL

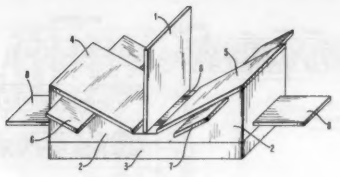
Harald Dahms, Ossining, and Heinrich E. Hunziker, Katonah, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 30, 1969, Ser. No. 889,279

Int. Cl. G08b 5/00

U.S. Cl. 340—373 **13 Claims**

This disclosure describes an electromechanical display panel operated by electrostatic forces. The panel is composed of individual display units which provide dual color display under passive illumination. Their distinctive feature is a novel and very simple configuration, leading to advantages of small size, high speed, relatively low-operating voltage and feasibility of fabricating economically panels containing a large number of such units. The units consist of electrically conducting, rectangular flags, positioned within parallel, V-shaped grooves by a magnetic field that biases the flag toward the central position in the groove. The panel possesses the half-select property. Voltages are applied to the flags and to electrode strips on the groove walls to cause a selected flag to show one or its other side. No erase step is required between writing operations. A written pattern is held indefinitely by electrostatic biasing and can be read out by employing the capacitance between a flag and its adjacent wall electrode.



3,648,282

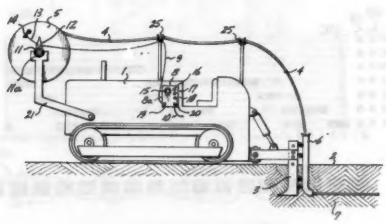
ALARM SIGNAL APPARATUS TO INDICATE DAMAGE TO THE INSULATION OF AN ELECTRICAL CABLE AS IT IS BEING LAID UNDERGROUND

John B. Kelly, 2205 54th Ave. E., Tacoma, Wash.

Filed Feb. 17, 1970, Ser. No. 11,964

Int. Cl. G08b 21/00

U.S. Cl. 340—421 **15 Claims**



During underground cable laying operations of electrical cables such as power, telephone, and TV cables, a cable damage alarm signal apparatus is secured to cable laying machinery equipped with a combined plow tooth and cable chute. This cable damage alarm signal apparatus has a detection circuit connected between the metal sheath of the cable, or alternatively its inner conductor, and the frame of the cable laying machinery. Upon damage of the insulation of the cable, current flows in the detection circuit and the alarm circuit is energized.

3,648,283

APPARATUS FOR DISPLAYING BEARING MARKERS ON A RADAR SCREEN

Carl Wilhelm Busch, and Kurt Scheer, both of Bremen, Germany, assignors to Fried Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed July 11, 1969, Ser. No. 840,941

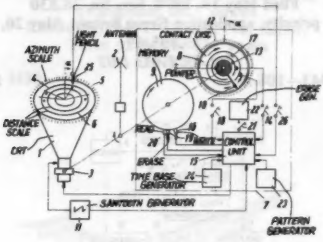
Claims priority, application Germany, July 12, 1968, P 17 73 831.7

Int. Cl. G01s 7/12

U.S. Cl. 343—5 EM **10 Claims**

Apparatus for use with a position-finding system that operates according to the reflected beam principle. This position-finding system, e.g., a radar system, has a revolving beam-receiving antenna as well as a cathode-ray display tube with a deflection system arranged to rotate in synchronism with the antenna. The apparatus according to the present invention is intended to provide a display of one or more radi-

ally extending traces on the screen of the cathode-ray tube at selectable angular positions thereof to provide reference bearing information to the operator of the system. The apparatus includes a memory device, connected to rotate in synchronism with the antenna, for storing signals at



preselected angular positions on its surface. The apparatus further includes means to write signals into or erase signals from the memory device and means to repeatedly read out these signals from the memory device during each revolution thereof to display a bearing trace on the cathode-ray tube screen in response to each signal when read.

3,648,284

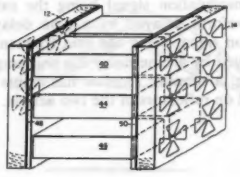
TWO-FACE PHASED ARRAY

Peter R. Dax, and Thomas M. Moore, both of Severna Park, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 6, 1969, Ser. No. 847,833

Int. Cl. G01s 9/02; H01q 3/26

U.S. Cl. 343—5 R **4 Claims**



A phased array consisting of two radiating faces back-to-back with time shared solid-state transmit circuits disposed thereinbetween for enabling each of the radiating faces in a high-duty cycle operating mode to optimize utilization of the solid-state capabilities of the transmit circuits.

3,648,285

AIRCRAFT ELECTRONIC LANDING RESPONSER SYSTEM USING SCANNING PENCIL BEAM GROUND ANTENNA

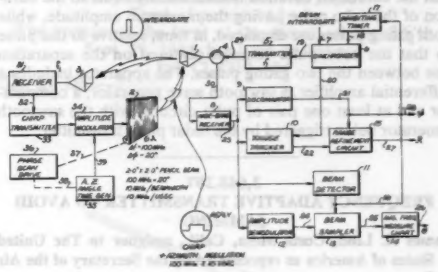
Lon L. Sanders, Palos Verdes Peninsula, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Mar. 30, 1970, Ser. No. 23,757

Int. Cl. G01s 9/56

U.S. Cl. 343—6.5 R **10 Claims**

An electronic approach and landing aid system involving the use of an airborne interrogator and a ground station having a rapid elevation frequency scan and a somewhat slower azimuth phase scan of a planar array. Each interrogating pulse produces a chirp pulse at the ground station and each chirp pulse produces one complete elevation scan cycle of the pencil beam formed by the planar array. Elevation angle data is air derived from the frequency of the pencil beam



energy as it passes across the aircraft, and range is determined in proportion to ground chirp time between interrogating pulses and corresponding replies. Azimuth position of the ground antenna pencil beam is separately supplied through an independent modulation which is correspondingly decoded in the air.

3,648,286

METHOD AND APPARATUS FOR SEARCHING, SELECTING AND TRACKING TARGETS UTILIZING A RADAR HAVING A RANGE GATE

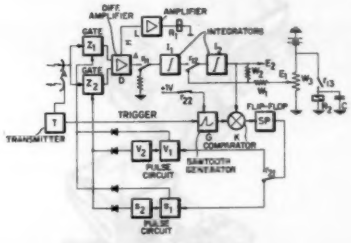
Heilmuth Schoneborn, Assling, Germany, assignor to Messerschmitt-Bolkow-Blohm Gesellschaft Mit Beschrankter Haftung, Ottobrunn near Munich, Germany

Filed Dec. 2, 1969, Ser. No. 881,547

Claims priority, application Germany, Dec. 13, 1968, P 18 14 476.8

Int. Cl. G01s 9/14

U.S. Cl. 343—7.3 **10 Claims**



In a method for searching, selecting and tracking targets in a given range, utilizing a radar set having a range gate, two successive and contiguous gating pulses are generated responsive to transmission of each radar pulse, and have a duration and position, relative to the radar pulse, corresponding to the target area to be covered so as to contain

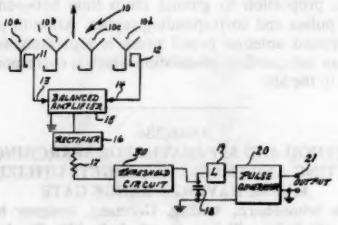
all echo pulses resulting from the radar pulse. The two gating pulses are displaced, in time, relative to the echo pulses in a time direction such that each gating pulse contains the same content of echo pulse energy or, alternatively speaking, so that the echo pulse having the maximum amplitude is evenly divided between the two gating pulses and centered on the separation line therebetween. The durations of the gating pulses are then decreased, either continuously or stepwise, so that the combined duration is substantially equal to the duration of the echo pulse having the maximum amplitude, while both gating pulses are displaced, in time, relative to this pulse so that the echo pulse remains centered on the separation line between the two gating pulses. The apparatus includes a differential amplifier, a sawtooth wave generator, a comparator and at least one pair of pulse circuits, with the sawtooth generator being triggered by the radar pulse transmitter.

3,648,287

FREQUENCY ADAPTIVE TRANSMITTER TO AVOID JAMMING

James N. Lind, Costa Mesa, Calif., assignor to The United States of America as represented by the Secretary of the Air Force

Filed Dec. 18, 1969, Ser. No. 889,869
Int. Cl. G01s 7/36
U.S. Cl. 343—18 E **2 Claims**



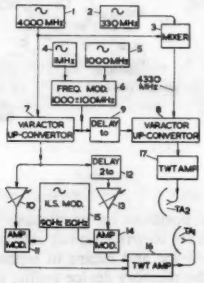
A frequency adaptive transmitter to avoid jamming wherein a combination of a frequency agile transmitter, a balanced amplifier and a directionally sensitive antenna senses that it is being jammed at a certain frequency and then retunes the transmitter to a frequency region free of the jamming signal.

3,648,288

AIRCRAFT LANDING RADIO GUIDANCE RECEIVERS

John Benjamin, Farnborough, and John Michael Jones, Hindhead, both of England, assignors to Minister of Technology in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed May 19, 1970, Ser. No. 38,830
Claims priority, application Great Britain, May 20, 1969, 25,695/69
Int. Cl. G01s 1/02
U.S. Cl. 343—108 R **8 Claims**



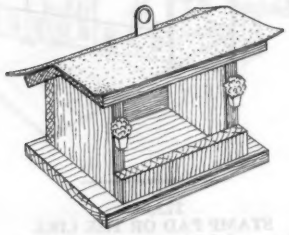
Transmitter apparatus for glide path guidance includes two aerials spaced apart (preferably so that the perpendicular bisector of a line joining the aerials is parallel to the desired glide path) and means for feeling them with distinct but related frequency-modulated waveforms so as to yield at least two distinguishable cross-correlation products whose relative amplitudes will vary differentially with displacements from the desired glide path.

One aerial may be fed with a first carrier frequency modulated with a first modulation signal and the other aerial with a second carrier frequency modulated with second and third modulation signals, the second modulation signal being a frequency modulated waveform amplitude-modulated at 90 Hz., the first modulation signal being the said frequency-modulated waveform delayed by a time delay *to*, and the third modulation signal being the said frequency-modulated waveform delayed by a time delay 2*to* and amplitude-modulated at 150 Hz. A monitor receiver has inputs connected to inputs mounted on reflectors of the two aerials.

DESIGNS

MARCH 7, 1972

223,047
BIRD FEEDER
Leonard M. Stanek, 230 Belle Drive, Northlake, Ill. 60164
Filed May 14, 1970, Ser. No. 22,987
Term of patent 3½ years
Int. Cl. D30—*03*
U.S. Cl. D30—14

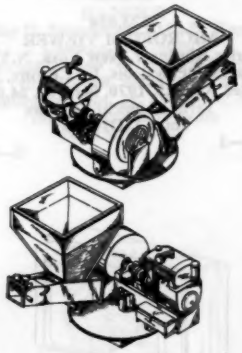


223,048
TURTLE SHELL TOY
Edwin B. Tillinger, 5403 Twining Drive, Tinker Air Force Base, Oklahoma City, Okla. 73145
Filed Nov. 25, 1970, Ser. No. 26,160
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—2

223,049
PAPER TOWEL DISPENSER
Riley H. Brooks, 1522 1st St., Webster City, Iowa 50595
Filed Nov. 12, 1970, Ser. No. 25,952
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D52—2

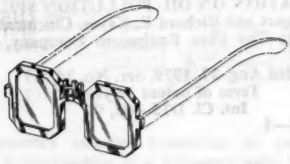
223,050
TEMPERATURE PROBE
Stephens N. Sato, San Diego, Calif., assignor to Ivac Corporation, San Diego, Calif.
Filed Dec. 15, 1969, Ser. No. 20,507
Term of patent 14 years
The portion of the term of the patent subsequent to Sept. 29, 1984, has been disclaimed
Int. Cl. D10—*04*
U.S. Cl. D52—7

223,051
PARTICULATE MATERIAL DISTRIBUTOR FOR UTILIZATION ON OIL POLLUTION SPILLS
Ralph E. Lingert and Richard E. Keyes, Cincinnati, Ohio, assignors to The Finn Equipment Company, Cincinnati, Ohio
Filed Aug. 27, 1970, Ser. No. 24,717
Term of patent 14 years
Int. Cl. D15—*03, 99*
U.S. Cl. D55—1

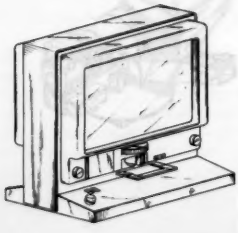


223,052
PHONOGRAPH CONSOLE
William B. Donnelly, Syracuse, N.Y., assignor to General Electric Company
Filed Nov. 10, 1970, Ser. No. 25,911
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4

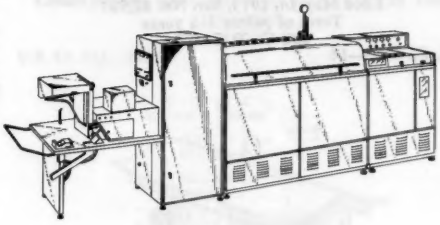
223,053
EYEGLASS FRAME FRONT
William E. Woodruff, 245 Jackson St., Columbus, Ohio 43206
Filed June 8, 1970, Ser. No. 23,342
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D57—1



223,054
MICROFILM VIEWER
William Charles Kinsinger, New York, N.Y., assignor to Metagraphic Systems, Inc., Bronx, N.Y.
Filed Aug. 25, 1970, Ser. No. 24,683
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D61—1

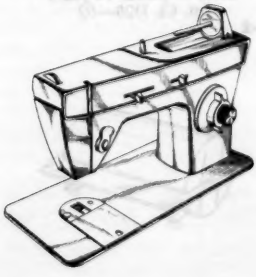


223,055
PHOTOGRAPHIC FILM PROCESSOR
Ralph M. Vigna, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Aug. 27, 1970, Ser. No. 24,733
Term of patent 14 years
Int. Cl. D16—*04*
U.S. Cl. D61—1

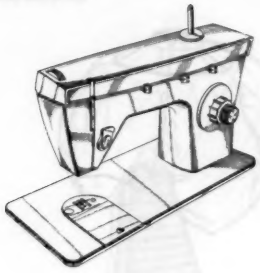


223,056
STAMP PAD OR THE LIKE
Eugene J. Majewski, 121 Elmore St., Park Ridge, Ill. 60068
Filed Nov. 30, 1970, Ser. No. 26,221
Term of patent 14 years
Int. Cl. D18—*99*
U.S. Cl. D64—10

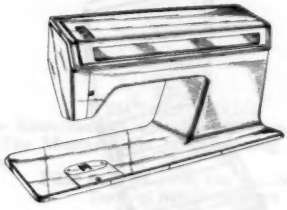
223,057
SEWING MACHINE FRAME
Donald M. Genaro, Haworth, N.J., assignor to The Singer Company, New York, N.Y.
Filed Aug. 10, 1970, Ser. No. 24,382
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D70—1



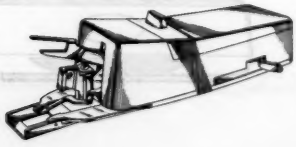
223,058
SEWING MACHINE FRAME OR SIMILAR ARTICLE
Donald M. Genaro, Haworth, N.J., assignor to The Singer Company, New York, N.Y.
Filed Aug. 14, 1970, Ser. No. 24,501
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D70—1



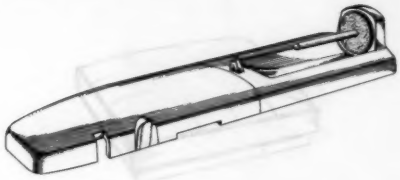
223,059
SEWING MACHINE FRAME
Donald M. Genaro, Haworth, N.J., assignor to The Singer Company, New York, N.Y.
Filed Oct. 5, 1970, Ser. No. 25,337
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D70—1



223,060
SEWING MACHINE ATTACHMENT FOR MAKING BUTTONHOLES OR THE LIKE
Donald M. Genaro, Haworth, N.J., assignor to The Singer Company, New York, N.Y.
Filed May 25, 1970, Ser. No. 23,132
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D70—2



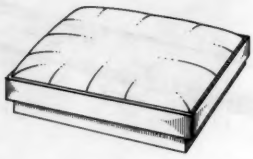
223,061
TOP COVER FOR A SEWING MACHINE OR SIMILAR ARTICLE
Thaddeus J. Zylbert, Morris Plains, N.J., assignor to The Singer Company, New York, N.Y.
Filed June 19, 1970, Ser. No. 23,576
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D70—2



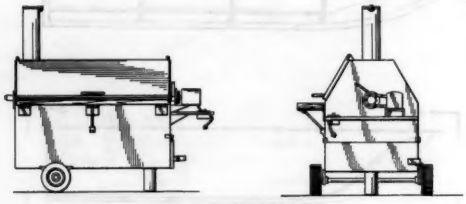
223,062
BOAT HULL
Robert Frank Winter, 7221 N. Peoria Ave., Tulsa, Okla. 74126
Filed Nov. 25, 1970, Ser. No. 26,159
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D71—1

223,063
HANGER
Borislav D. Jovanovich, 6122 N. Kenmore, Chicago, Ill. 60603
Original design application Nov. 29, 1968, Ser. No. 14,711, now Patent No. 215,898, dated Nov. 4, 1969. Divided and this application Sept. 29, 1969, Ser. No. 19,819
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D80—8

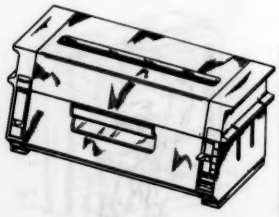
223,064
PILLOW DISPLAY STAND
James T. Peterson, Prospect Heights, Ill., assignor to Mohasco Industries, Inc., Amsterdam, N.Y.
Filed Dec. 12, 1969, Ser. No. 20,477
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D80—9



223,065
CHARCOAL OVEN
Anthon H. Turner, Kingfisher, Okla., assignor to Turner and Sons, Kingfisher, Okla.
Filed June 23, 1970, Ser. No. 23,622
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D81—10



223,066
COMBINED TOASTER AND OVEN OR THE LIKE
Thomas E. Hanson, Syracuse, and John E. Jolliffe, Manlius, N.Y., assignors to Proctor-Silex Incorporated, Philadelphia, Pa.
Filed Aug. 3, 1970, Ser. No. 24,275
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D81—10

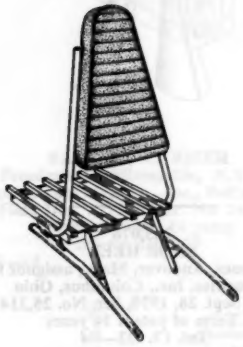


223,067
ELECTRIC HAIR DRYER BONNET
Norman A. Steinkamp, Chicago Heights, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed July 6, 1970, Ser. No. 23,840
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—10

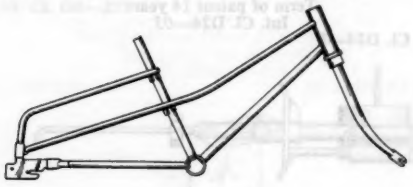
223,068
COMBINED ILLUMINABLE MAKEUP MIRROR AND VANITY CASE
Douglas G. Long, Lombard, and Robert S. Waters, Oakbrook, Ill., assignors to Sunbeam Corporation Chicago, Ill.
Filed July 9, 1970, Ser. No. 23,877
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D86—10

223,069
CLOTHING CARE IMPLEMENT
Eric Michael Roth, R.R. 1, Unionville, Ontario, Canada
Filed Feb. 1, 1971, Ser. No. 111,802
Claims priority, application Canada Sept. 4, 1970
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D86—13

223,070
MOTORCYCLE LUGGAGE CARRIER AND BACKREST COMBINATION
John H. Heltzen, 1091 Terrace Drive 90807, and Frank G. Stone, 6655 Orange, Apt. D 90805, both of Long Beach, Calif.
Filed Jan. 20, 1971, Ser. No. 108,234
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D90—3

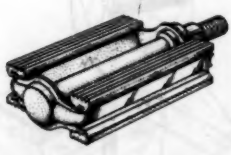


223,071
BICYCLE FRAME
Viktor Schreckengost, Cleveland Heights, Ohio, assignor to The Murray Ohio Manufacturing Co., Nashville, Tenn.
Filed Aug. 20, 1970, Ser. No. 24,612
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D90—8

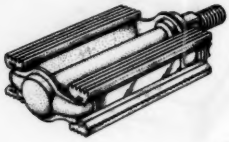


223,072
REFLECTIVE BICYCLE HANDLEBAR
Carlton P. Pawsat and Robert F. Humlong, Maysville, Ky., assignors to Wald Manufacturing Company, Inc., Maysville, Ky.
Filed Oct. 26, 1970, Ser. No. 25,649
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D90—11

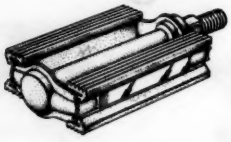
223,073
REFLECTIVE BICYCLE PEDAL
Carlton P. Pawsat and Robert F. Humlong, Maysville, Ky., assignors to Wald Manufacturing Company, Inc., Maysville, Ky.
Filed Nov. 13, 1970, Ser. No. 25,956
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D90—14



223,074
REFLECTIVE BICYCLE PEDAL
Carlton P. Pawsat and Robert F. Humlong, Maysville, Ky., assignors to Wald Manufacturing Company, Inc., Maysville, Ky.
Filed Nov. 13, 1970, Ser. No. 25,957
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D90—14

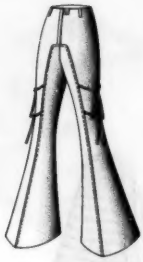


223,075
REFLECTIVE BICYCLE PEDAL
Carlton P. Pawsat and Robert F. Humlong, Maysville, Ky., assignors to Wald Manufacturing Company, Inc., Maysville, Ky.
Filed Nov. 13, 1970, Ser. No. 25,958
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D90—14

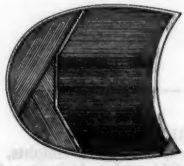


223,076
ELECTRIC SHAVER
Robert O. Ernest, Oak Park, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed Jan. 11, 1971, Ser. No. 105,792
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D95—3

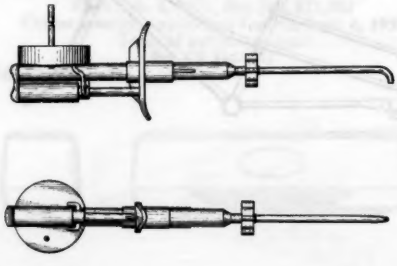
223,077
PANTS
Jack S. Benrube, Miami Beach, Fla., assignor to Nathan Rosen, North Miami, Fla., and Morris Luxenberg, Brooklyn, N.Y., fractional part interest to each
Filed Nov. 16, 1970, Ser. No. 25,977
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—227



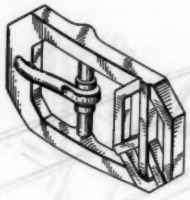
223,078
SHOE HEEL
Kenneth E. Jones, Andover, Mass., assignor to SCOA Industries, Inc., Columbus, Ohio
Filed Sept. 28, 1970, Ser. No. 25,214
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—323



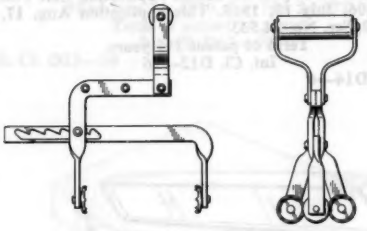
223,079
MEDICAL, DENTAL AND VETERINARY IRRIGATOR AND APPLICATOR
Garrison G. Trupp, 4600 York Road, Baltimore, Md. 21212, and Marc A. Trupp, 23 Stonehenge Circle, Pikesville, Md. 21208
Filed July 24, 1970, Ser. No. 24,107
Term of patent 14 years
Int. Cl. D24—*03*
U.S. Cl. D24—1



223,080
BUCKLE
Norman A. Roy, Cold Spring Harbor, N.Y., assignor to NAR Enterprises, Inc., New York, N.Y.
Filed Aug. 17, 1970, Ser. No. 24,508
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—446



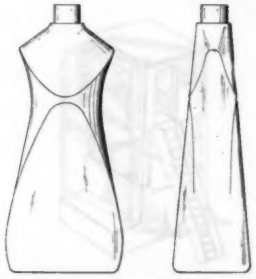
223,081
BATTERY CARRIER
Alan A. Freedman, Williamsville, N.Y., assignor to Bergman Tool Mfg. Co., Inc., Buffalo, N.Y.
Filed Dec. 3, 1970, Ser. No. 26,270
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—14



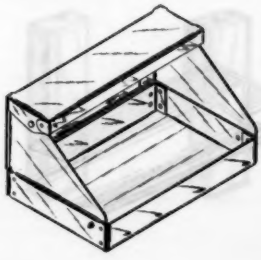
223,082
BRACKET FOR AUTOMOTIVE CONDENSERS
Jacob F. Fromm, Upper Montclair, N.J., assignor to Springfield Electrical Specialties, Inc., New York, N.Y.
Filed Oct. 16, 1970, Ser. No. 25,526
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—233

223,083
BOTTLE
James E. Plummer, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed Oct. 15, 1970, Ser. No. 25,501
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—113

223,084
BOTTLE
Richard L. Weckman, Perrysburg, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed Oct. 15, 1970, Ser. No. 25,502
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—116

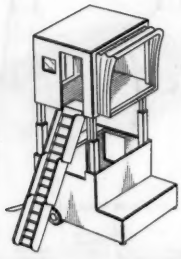


223,085
COMBINED DISPLAY AND STORAGE CASE
Charles R. Zimmerman, Los Angeles, Calif., and Raymond Tuccio, Scotch Plains, N.J., assignors to Mattel, Inc., Hawthorne, Calif.
Filed Sept. 2, 1970, Ser. No. 25,018
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—221



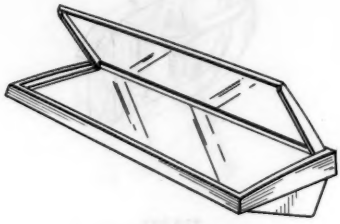
223,086
ROTATABLE SURVEILLANCE CAPSULE FOR BUILDINGS
Ronald B. Royster, Sr., 1705 Belle Haven Drive, Apt. 203, Landover, Md. 20785
Filed Jan. 15, 1970, Ser. No. 20,943
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D13—1

223,087
PORTABLE LOADING VESTIBULE
Ronald C. Hinman, Mission Viejo, Calif., assignor to Western Gear Corporation, Lynwood, Calif.
Filed Sept. 30, 1970, Ser. No. 25,292
Term of patent 14 years
Int. Cl. D25—*99*
U.S. Cl. D13—1

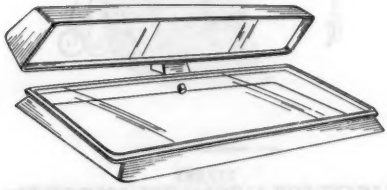


223,088
EXTRUDED H CONNECTOR MEMBER
Irvine Kimmel, 2375 NW. 75th St., Miami, Fla. 33147
Filed Aug. 17, 1970, Ser. No. 24,548
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D13—6

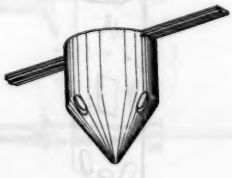
223,089
REAR VIEW MIRROR
Lynn Harold Hodge, 12618 Wyoming Ave., Detroit, Mich. 48238
Continuation-in-part of design application Ser. No. 17,288, May 23, 1969. This application Aug. 17, 1970, Ser. No. 24,531
Term of patent 3½ years
Int. Cl. D12—*16*
U.S. Cl. D14—6



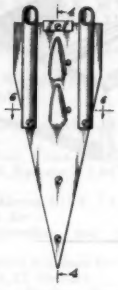
223,090
STATIONARY CAR-TOP MIRROR
Lynn Harold Hodge, 12618 Wyoming Ave., Detroit, Mich. 48238
Continuation-in-part of design application Ser. No. 18,206, July 15, 1969. This application Aug. 17, 1970, Ser. No. 24,533
Term of patent 3½ years
Int. Cl. D12—*16*
U.S. Cl. D14—6



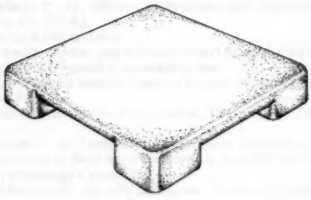
223,091
DRIVE POINT FOR EXPLOSIVE CHARGE
Stanley T. Graham and Robert G. Rintoul, both of 448 42nd Ave. SE., Calgary 24, Alberta, Canada
Filed June 24, 1969, Ser. No. 17,842
Term of patent 14 years
Int. Cl. D22—*03*
U.S. Cl. D22—10



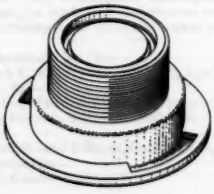
223,092
BEACH INSERTABLE STANDARD FOR PAIR OF FISHING POLES WITH FISH ALARMS
Augusta Tucker, Jr., 547 W. 91st St., Los Angeles, Calif. 90044
Filed Dec. 8, 1969, Ser. No. 20,395
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—22



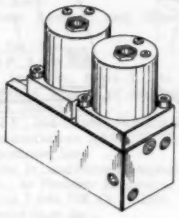
223,093
LIGHTNING INSULATOR PAD FOR CAMPERS
John B. Cato, 206 Combs St., Milton, Fla. 32570
Filed July 22, 1970, Ser. No. 24,071
Term of patent 14 years
Int. Cl. D13—*99*
U.S. Cl. D23—10



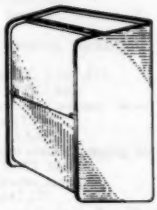
223,094
CONVERTIBLE VALVE FOR VACUUM RELEASE OR PRESSURE RELIEF
Clarence B. Coleman and Harry R. Kattelmann, Oakland, Calif.; said Kattelmann assignor to Fabricated Metals, Inc.
Filed Aug. 20, 1970, Ser. No. 24,608
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—19



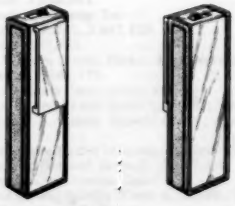
223,095
SOLENOID CONTROLLED VALVE
C. Andrew Allen, Chatham, Ga., assignor to S. A. Allen, Inc.
Filed Sept. 17, 1970, Ser. No. 25,043
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—19



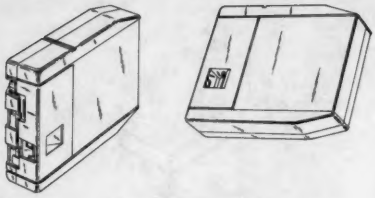
223,096
CABINET FOR PROCESSING DATA DISCS
Channing W. Gilson, Los Angeles, Calif., assignor to Infotechnics, Inc., Van Nuys, Calif.
Filed Sept. 23, 1970, Ser. No. 25,159
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5



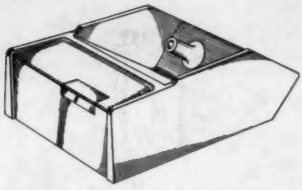
223,097
RADIO PAGER OR SIMILAR ARTICLE
Donald K. Krumin, Fort Lauderdale, and Richard J. Toth, Oakland Park, Fla., assignors to Motorola, Inc., Franklin Park, Ill.
Filed Nov. 18, 1970, Ser. No. 26,070
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14



223,098
AUDIO VISUAL CARTRIDGE
Paul D. Catalano, Manhasset, and George C. Hoehne, Bellerose, N.Y., assignors to Retention Communications Systems, Inc., New York, N.Y.
Filed Dec. 14, 1970, Ser. No. 26,497
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—14



223,099
BATTERY CHARGER
Stephens N. Sato, San Diego, Calif., assignor to Ivac Corporation, San Diego, Calif.
Filed Sept. 25, 1970, Ser. No. 25,188
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D26—15



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 7TH DAY OF MARCH, 1972

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Aba Corporation: *See—*
Rossi, Alberto; and Sury, Ernst, 3,647,791.

Abe, Fujio; and Crawford, Clifford R., to Burlington Industries, Inc. Data monitoring system. 3,648,026, Cl. 235-92.

Abe, Hisao: *See—*
Tatsumi, Masanori; and Abe, Hisao,3,647,884.

Abe, Junnosuke: *See—*
Ishizawa, Kazutomo; Nagata, Yasunori; Abe, Junnosuke; and Fukuoka, Akira,3,646,992.

Abe, Yoshiaki: *See—*
Inoue, Takashi; and Abe, Yoshiaki,3,646,916.

Abel, Heinz Reinach: *See—*
Deflorin, Alberto; Abel, Heinz Reinach; Berger, Alfred; Casty, Richard; and Toepfl, Rosemarie,3,647,728.

Aberer, Leo F.: *See—*
Scott, Robert J.; and Aberer, Leo F.,3,646,671.

A.B.M. (Malting) Limited: *See—*
Stowell, Keith Christopher; and Howlett, Peter Michael, 3,647,473.

Abt, Ronald C., to Cincinnati Milacron Inc. Electrochemical machining apparatus. 3,647,671, Cl. 204-224.

Ackerman, James H., to Sterling Drug Inc. 5-Substituted-1,3-benzenediacrylic and dipropionic acids. 3,647,864, Cl. 260-515.

Ackermann, Karl, to Bosch, Robert, Photokino GmbH. Electronic flash unit with preliminary flash for automatic timing. 3,648,104, Cl. 315-151.

Acket, Gerard Adriaan; and Vlaardingerbroek, Marinus Teunis, to U.S. Philips Corporation. Semiconductor device for amplifying microwaves. 3,648,185, Cl. 330-5.

Acoveno, Floyd. Production of copper, nickel oxide and zinc oxide. 3,647,423, Cl. 75-103.

Acu-Tech Corporation: *See—*
Ayres, John E., 3,647,121.

Adams, Ladd M., to Balon Corporation. High pressure low torque valve assembly. 3,647,178, Cl. 251-148.

Adams, Ladd M.: *See—*
Scaramucci, Domer; and Adams, Ladd M.,3,647,179.

Adams, Robert P., to Albany Enterprises, Inc. Circular slide rule. 3,648,025, Cl. 235-83.

Adcock, Stuart Samuel: *See—*
Bryce-Smith, Derek; and Adcock, Stuart Samuel,3,647,715.

Addressograph-Multigraph Corporation: *See—*
Baltazzi, Evan S.; Shelffo, Loren EE.; and Moduthagam, Michael, 3,646,866.

Adickes, Cecil F., to Tonka Corporation. Toy vehicle. 3,646,706, Cl. 46-201.

Adler, Stanford L., to Technicon Corporation. Method and apparatus for the provision of fluid interface barriers. 3,647,070, Cl. 210-83.

Advanced Technology Center, Inc.: *See—*
Reed, Madison W., Jr.; and Schwemer, Warren C., 3,647,551.

Aerojet-General Corporation: *See—*
Neal, Warren D., 3,647,050.

Aerostatic Limited: *See—*
Dee, Colin W., 3,647,272.

Aerpat A. G.: *See—*
Sanders, John Stewart; Savage, Donald Stanley; and Summerlin, Frederick Arthur, 3,646,757.

Agfa-Gevaert Aktiengesellschaft: *See—*
Huckstadt, Harald; Saleck, Wilhelm; Randolph, August; and Moll, Franz, 3,647,469.
Koleff, Boris; and Nagel, Erich, 3,646,870.
Thate, Kurt; and Muller, Jurgen, 3,647,596.
von Konig, Anita; and Timmler, Helmut, 3,647,451.
Von Sybel, Reinhard; Englesmann, Dieter; and Fauth, Gunter, 3,646,862.

AgMac Inc.: *See—*
Tiura, George O., 3,646,738.

Ahlgrim, Michael; Kandler, Joachim; Lenz, Hans-Joachim; Mietens, Gerhard; and Ott, Willy, to Knapsack Aktiengesellschaft. Surface-pretreatment of articles made from polythylene or polypropylene or corresponding copolymers for chemical nickel-plating. 3,647,514, Cl. 117-47.

Air Products and Chemicals, Inc.: *See—*
Hoffman, Joseph K.; and Russell, James P., 3,647,862.

Ajinomoto Co., Inc.: *See—*
Shimazaki, Hideo; Tsukamoto, Shuji; Saito, Tadaomi; Eguchi, Sadanari; and Komata, Yasushi, 3,647,825.

Akron Standard: *See—*
Dieterich, Donald B.; and Schrum, George L., 3,647,126.

Aktiebolaget Electrolux: *See—*
Ohlin, Bror Eric Gustav, 3,647,079.

Aktiebolaget Karlstads Mekaniska Werkstad: *See—*
Pehrsson, Anders Lennart; and Andersson, Sven-Ola, 3,647,318.

Aktiebolaget Tudor: *See—*
Andersson, John Lennart; and Nilsson, Ove Karl-Gustav, 3,647,548.

Albany Enterprises, Inc.: *See—*
Adams, Robert P., 3,648,025.

Alberts, Gene S.; and Flur, Barry L., to International Business Machines Corporation. Process of fabricating a hybrid magnetic film. 3,647,643, Cl. 204-15.

Albertson, Clarence E.; and Okubo, Howard S. Friction elements and methods of their manufacture. 3,647,722, Cl. 260-2.5

Alco Standard Corporation: *See—*
De Long, Charles, Jr.; and Newell, Stephen D., 3,647,139.

Alcock, Richard A., to Fastener Engineers, Inc. Wire drawing apparatus and method. 3,646,798, Cl. 72-289.

Alcor Chemical Corporation: *See—*
Treiber, Robert L., 3,647,649.

Alexander, Gilbert L.; Neaville, Arthur W.; and Mayfield, William A. Automatic drive-in store. 3,647,026, Cl. 186-1.

Alfrey, Turner, Jr.: *See—*
Schrenk, Walter J.; Chisholm, Douglas S.; Cleereman, Kenneth J.; and Alfrey, Turner, Jr.,3,647,612.

All-Steel Equipment Inc.: *See—*
Hurtt, Terry J., 3,647,934.

Allen & Hanburys Limited: *See—*
Bays, David Edmund; and Foster, Roy Vivian, 3,647,881.

Allen, Frank D.: *See—*
DeMeyer, Dennis E.; and Allen, Frank D.,3,647,448.

Allen, Mona Armstrong: *See—*
DeMeyer, Dennis E.; and Allen, Frank D.,3,647,448.

Allen, Thomas E., to Caterpillar Tractor Co. High pressure relief belleville valve. 3,646,957, Cl. 132-525.

Allied Chemical Corporation: *See—*
Anello, Louis G.; Sweeney, Richard F.; and Litt, Morton H., 3,647,887.
Anello, Louis G.; Sweeney, Richard F.; and Litt, Morton H., 3,647,889.
Rumanowski, Edmund J., 3,647,413.
Spiliotis, Nicholas J., 3,647,652.

Allis-Chalmers Manufacturing Company: *See—*
Drewry, Hugh S., 3,647,195.
Harrison, William J., 3,647,013.

Allred, Bobby J., to Allred Metal Stamping Works, Inc. Drawer guide construction. 3,647,271, Cl. 308-3.6

Allred Metal Stamping Works, Inc.: *See—*
Allred, Bobby J., 3,647,271.

Allwright, Eric Sydney; and Godwin, Roy Charles, to British Aircraft Corporation. Aircraft doors. 3,647,169, Cl. 244-129.

Alperin, Morton. Method and apparatus for reducing sonic booms. 3,647,160, Cl. 244-1.

Alsup, Michael J.; and Guevara, Alfredo R., to Eastman Kodak Company. Process for preparing high-relief printing plates. 3,647,446, Cl. 96-35.1

Althaus, Ernst, to Orenstein & Koppel Aktiengesellschaft. Hydraulic chain tensioning device, especially for track laying vehicles. 3,647,270, Cl. 305-10.

Alton, Ahdor H.; and Kohn, Mitchell I., to Gulton Industries, Inc. Signal level responsive circuit. 3,648,183, Cl. 328-196.

Amakasu, Tatuo; and Yamazaki, Takao, to Koushuha-Netsuren Kabushiki Kaisha. Method of preserving mechanical properties of steel wire during spot welding. 3,648,006, Cl. 219-58.

Amchem Products, Inc.: *See—*
Schneider, George, 3,647,569.

Amerace Esna Corporation: *See—*
Barnes, Gerald, 3,646,981.

American Cyanamid Company: *See—*
Di Leone, Roland Ralph, 3,647,920.
Los, Marinus, 3,647,821.
McGahren, William James; Porter, John Norman; and Korshalla, Joseph Daniel, 3,647,776.

American Home Products Corporation: *See—*
Potoski, John R.; and Freed, Meier E., 3,647,790.
Stein, Reinhardt P.; Smith, Robert C., Jr.; and Smith, Herchel, 3,647,784.
Sulkowki, Theodore S.; and Mascitti, Albert A., 3,647,865.
Wolf, Milton; and Diebold, James L., 3,647,800.

American Nucleonics Corporation: *See—*
Martin, David R.; and Sauter, Walter A., 3,648,176.

American Optical Corporation: *See—*
Lavallee, Robert G., 3,647,299.

American Standard Inc.: *See—*
Langlois, Henry J., 3,646,756.
Parkinson, Richard Grant; and Griffin, James Richard, 3,647,144.
American Technical Industries, Inc.: *See—*
Spiegel, Si I., 3,647,605.
Ametek, Inc.: *See—*
Todd, Hoyt H.; McIntyre, John F.; and Lewis, Le Roy, 3,647,572.
Amex Corporation: *See—*
Snelling, James W., 3,646,897.
AMF Incorporated: *See—*
Blewitt, Donald Joseph; and Schmidt, Otto Karl, 3,646,943.
Nance, Robert L., 3,648,054.
Rudd, Wallace C., 3,648,005.
Walters, William T., 3,646,805.
AMP Incorporated: *See—*
Kobler, Robert James, 3,648,213.
Teagno, Wladimiro, 3,648,115.
Ampex Corporation: *See—*
Audeh, Azmi S.; Deodhar, Anil N.; and Glattfelder, Henry G., 3,648,134.
Eul, Edward A., Jr.; and Richter, Ronald B., 3,647,990.
Mattas, Charles B., 3,647,989.
Rose, Marshall G., Jr., 3,647,951.
Weber, Sheldon Alan, 3,647,539.
Amplifon S.a.s.: *See—*
Gay, Guido, 3,648,196.
Anaconda Wire and Cable Company: *See—*
Ulmer, William W., 3,647,726.
Anderle, Joseph A., to Levolor Lorentzen, Inc. Inclined-soffit Venetian-blind and installation. 3,646,986, Cl. 160-168.
Andersen, Axel Brix, to Smidth, F. L., & Co. Method of machining cylindrical shells. 3,646,838, Cl. 82-1.
Anderson, Dwayne Roy, 50% to Hayes, George D. Tool holder. 3,647,232, Cl. 279-68.
Anderson, Eugene A. Rotary blade for meat grinder. 3,646,979, Cl. 146-189.
Anderson, George Edward, to RCA Corporation. Kinescope bias arrangement to provide both constant amplitude D. C. restoration pulses and arc discharge protection. 3,647,944, Cl. 178-5.4
Anderson, James H., Jr.: *See—*
Anderson, James H.; and Anderson, James H., Jr.,3,646,777.
Anderson, James H.; and Anderson, James H., Jr., to Coupling Corporation of America. Torque transmitting coupling. 3,646,777, Cl. 64-15.
Anderson, Philip J.: *See—*
Bodle, William W.; and Anderson, Philip J.,3,646,765.
Anderson Power Products, Inc.: *See—*
Goldman, Wayne E., 3,648,219.
Anderson, Robert K.; and Mills, Karl D. Compact hand held switching device with insertable switching means. 3,648,001, Cl. 200-157.
Andersson, John Lennart; and Nilsson, Ove Karl-Gustav, to Aktiebolaget Tudor. Method and apparatus for electrode conversion. 3,647,548, Cl. 136-82.
Andersson, Sven-Ola: *See—*
Pehrsson, Anders Lennart; and Andersson, Sven-Ola,3,647,318.
Andrade, Philip; and Rychlewski, Thaddeus V., to Sylvania Electric Products, Inc. Color modification apparatus for a color television system. 3,647,941, Cl. 178-5.4
Andrew, Herbert Francis; and Stead, Cecil Vivian, to Imperial Chemical Industries Limited. Reactive disazo dyestuffs containing triazines. 3,647,778, Cl. 260-153.
Andrews, Harry N.; Patterson, John F.; and Wilson, John F., to Westinghouse Electric Corporation. Fuel element for a nuclear reactor. 3,647,622, Cl. 176-68.
Anello, Louis G.; Sweeney, Richard F.; and Litt, Morton H., to Allied Chemical Corporation. Aryl-substituted polyfluoroalkoxyalkanes. 3,647,887, Cl. 260-611.
Anello, Louis G.; Sweeney, Richard F.; and Litt, Morton H., to Allied Chemical Corporation. Polyfluoroisopropoxyalkyl ethers. 3,647,889, Cl. 260-615.
Angell, Charles Leslie: *See—*
Rabo, Jule Anton; Angell, Charles Leslie; and Skeels, Gary William, Jr.,3,647,682.
Annand, Robert R.; Redmore, Derek; and Rushton, Brian M., to Petrolite Corporation. Use of cyclic amidine polymers as oil-in-water demulsifiers. 3,647,711, Cl. 252-344.
Anti-Pollution Systems, Inc.: *See—*
Greenberg, Jacob, 3,647,358.
Anzai, Masao: *See—*
Mizutani, Takashi; Anzai, Masao; and Ebihara, Akio,3,647,503.
Aonuma, Tatsuo: *See—*
Yokotsuka, Tamotsu; Aonuma, Tatsuo; Mogi, Koya; Fukushima, Danji; Yasuda, Atsushi; Watanabe, Hiroharu; Tsukada, Naoshi; and Arai, Akira,3,647,484.
Appareils de Precision et de Controle 'APC': *See—*
Gineste, Robert Maurice, 3,648,032.
Appleton, Anthony Derek: *See—*
Wilkin, Geoffrey Alan; McNab, Ian Roderick; and Appleton, Anthony Derek,3,648,088.
Ara, Inc.: *See—*
Mazelsky, Bernard, 3,647,999.
Arai, Akira: *See—*
Yokotsuka, Tamotsu; Aonuma, Tatsuo; Mogi, Koya; Fukushima, Danji; Yasuda, Atsushi; Watanabe, Hiroharu; Tsukada, Naoshi; and Arai, Akira,3,647,484.
Arai, Kiyoyuki, to Kabushiki Kaisha Koparu. Electronic shutter for photographic cameras. 3,646,869, Cl. 95-53.
Arand, John K., to General Electric Company. Gas turbine engine with improved afterburner. 3,646,763, Cl. 60-261.
Arasaki, Seitetsu; Yamamoto, Hisao; and Inaba, Shigeho, to Sumitomo Chemical Company, Ltd. Novel 3-indolylaliphatic acid anhydrides. 3,647,785, Cl. 260-240.
Arcesi, Joseph A.: *See—*
Rauner, Frederick J.; Arcesi, Joseph A.; and Guild, John R.,3,647,443.
Archer, Bill; and Low, John, III, to Arlo, Inc. Columnar joint. 3,646,719, Cl. 52-115.
Arguimbau, Lawrence B.; and Grason, Rufus L., to Grason-Stadler Company, Inc. Audiometer employing narrow-band noise masking. 3,647,968, Cl. 179-1.
Argus Chemical Corporation: *See—*
Kauder, Otto S., 3,647,841.
Arioli, Roberto. Apparatus for final immersion washing of continuous pieces of fabric. 3,646,785, Cl. 68-175.
Arkansas Rock and Gravel Co.: *See—*
Holland, John H., 3,647,096.
Arlo, Inc.: *See—*
Archer, Bill; and Low, John, III, 3,646,719.
Armaturenwerk Niedersheld GmbH: *See—*
Braas, Alfred, 3,646,958.
Armour Industrial Chemical Company: *See—*
Malec, Robert E.; and Betty, Roy J., 3,647,378.
Armsted Industries Incorporated: *See—*
Jeffreys, Lyman W., 3,646,991.
Arrance, Frank C.; and Rosa, Albert G., to McDonnell Douglas Corporation. Battery separator and method of producing same. 3,647,554, Cl. 136-145.
Arrow-Hart, Inc.: *See—*
Corley, Lawrence G.; and Johnson, David W., 3,648,142.
Artiano, Adrian; and Brown Robert M., to Black Clawson Company, The. Angle feed chipper with card breaker. 3,647,151, Cl. 241-92.
Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Nagamatsu, Kazuo; Yoshino, Masatsugu; Konno, Tsugio; and Ishida, Shinichi, 3,647,743.
Seko, Maomi; Takahashi, Yasunobu; Iwamoto, Takeaki; and Seno, Shikazo, 3,647,855.
Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Umemura, Yukio, 3,646,859.
Asaoka, Junichi: *See—*
Watanabe, Jun; Hosoi, Susumu; Kuwazaki, Masahiro; Ota, Akira; Takata, Toshikatsu; and Asaoka, Junichi,3,647,552.
Asbill, Clarence M.; and Heidelberg, Frederic H., said Asbill, Clarence M., assor. to said Heidelberg, Frederic H. Cigarette machine and method of manufacturing cigarettes. 3,646,942, Cl. 131-65.
Ashbrook, Clifford L. Bullet puller. 3,646,661, Cl. 29-275.
Ashby, Eugene C.; and Kobetz, Paul, to Ethyl Corporation. Di (alkali metal) beryllium tetrahydrides. 3,647,399, Cl. 23-360.
Ashcraft, Charles Ray, to Johnson & Johnson. Resin composition containing a polyacrylic acid- polyacrylamide copolymer and method of using the same to control resin deposition. 3,647,507, Cl. 117-38.
Ashland Oil & Refining Company: *See—*
Rozman, George J., 3,647,900.
Ashmead, Albert S.; and Shepard, Richard W., to Torrington Company, The. Package for elongated elements. 3,647,057, Cl. 206-17.
Astra Nutrition Aktiebolag: *See—*
Osterman, Sven Olof, 3,646,688.
Athey, Stuart E., to Hobart Manufacturing Company, The. Hydraulic control system for a washing machine. 3,646,948, Cl. 134-57.
Atit, Kishore M.: *See—*
De Wittie, H W.; Kirchstein, John A.; and Atit, Kishore M.,3,647,396.
Atkinson, Ward J.; and Cole, Edward N., to General Motors Corporation. Flow thru body ventilation. 3,646,876, Cl. 98-2.11
Atlantic Richfield Company: *See—*
Michaels, Glenn O., 3,647,909.
Wohgemuth, Larry G.; and Fritock, William H., 3,647,760.
Atlas Chemical Industries, Inc.: *See—*
Du Ross, James W.; and Lensack, Gabriel P., 3,647,477.
Atlas Copco Aktiebolag: *See—*
Lauber, Ernst Abraham; and Herron, Lorne Robert, 3,647,263.
Lauber, Ernst Abraham, 3,647,264.
Atom Manufacturing Company: *See—*
Pond, Robert B., 3,646,700.
Audeh, Azmi S.; Deodhar, Anil N.; and Glattfelder, Henry G., to Ampex Corporation. Reel servo system. 3,648,134, Cl. 318-6.
Aue, John R., to Westinghouse Electric Corporation. Shelf construction for a refrigerator door. 3,647,075, Cl. 211-153.
Automatic Switch Company: *See—*
Wiktor, Dominik M., 3,648,003.
Autotrol Corporation: *See—*
Prosser, David G., 3,646,819.
Avco Corporation: *See—*
Belason, E. Bruce; Castle, George K.; Crowley, Donald P.; and Morgida, Joseph V., 3,647,193.
Avery, W. & T., Limited: *See—*
Beardmore, Alfred Cyril; Cooke, Geoffrey Cyril; and Stringer, Donald Charles, 3,647,010.
AVM Corporation: *See—*
Cook, Arnold G., 3,648,022.

Ayres, John E., to Acu-Tech Corporation. Snap action valve for pressurized package. 3,647,121, Cl. 222-402.24

Baba, Takashi; and Matsuoka, Chikara, to Toyota Jidosha Kogyo Kabushiki Kaisha. Ball joint. 3,647,249, Cl. 287-90.

Babcock & Wilcox Company, The: *See*—
Rosen, Philip J., 3,648,144.

Bach, Horst Werner, to U.S. Philips Corporation. Reading and/or writing device for record carriers in card form. 3,648,023, Cl. 235-61.11

Bachelder, Albert J., to Polaroid Corporation. Photographic apparatus and method. 3,647,441, Cl. 96-29.

Back, Sangho E.; and Marti, Rueben A., to Crown Zellerbach Corporation. Method and apparatus for improving formation uniformity of paper. 3,647,618, Cl. 162-205.

Bader, Gottfried, to Bodenseewerk Geratetechnik GmbH. Device for controlling the fuel supply with propeller turbojet engines for aircraft by means of a throttle lever and a trimming lever. 3,648,033, Cl. 235-150.21

Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See*—
Sturm, Hans Juergen, 3,647,854.

Bagai, Satish Kumar; and Topham, Arthur, to Imperial Chemical Industries Limited. Pigment compositions. 3,647,496, Cl. 106-309.

Baginski, Albert R.; De Gelder, Jacob; and Marason, Gabriel, Jr., to Mattel, Inc. Sparking toy top. 3,646,703, Cl. 46-48.

Bailey, Knight V., to Bendix Corporation, The. Automatic coordinate determining device. 3,647,963, Cl. 178-19.

Bailey Meter Company: *See*—
Martin, John C.; and Thompson, William L., 3,646,815.

Bailey, Richard J., to GTI Corporation. Molded shunts for integrated circuits. 3,648,108, Cl. 317-2.

Bailey, Robert S. Enclosed flotation apparatus and process. 3,647,069, Cl. 210-44.

Bajek, Walter A.; and McLaughlin, James H., to Universal Oil Products Company. Octane number control of distillation column bottoms by varying heat input. 3,647,634, Cl. 196-132.

Bajek, Walter A.; and McLaughlin, James H., to Universal Oil Products Company. Octane number control of distillation column overhead by varying reflux. 3,647,635, Cl. 196-132.

Baker, Donald L. Game apparatus including swivelable projector and pivotable targets. 3,647,213, Cl. 273-101.

Baker, Mary Joan H.; and Baker, Robert C. Packet technology. 3,647,305, Cl. 401-7.

Baker, Paul I. Equipment accessory locking apparatus. 3,646,786, Cl. 70-59.

Baker, Robert C.: *See*—
Baker, Mary Joan H.; and Baker, Robert C.,3,647,305.

Bako, Erzsebet: *See*—
Harsanyi, Kalman; Reiter, Jozsef; Korbonits, Dezso; Gonczi, Csaba; Takacs, Kalman; Bako, Erzsebet; Leszkovszky, Gyorgy; Tardos, Laszlo; and Vertesy, Csaba,3,647,809.

Baldwin, Tony Lewis; and Burton, Roy Harold, to Imperial Chemical Industries Limited. Method and apparatus for making staple-fibre yarns. 3,646,745, Cl. 57-36.

Ball, Henry; and Peterson, Hold Le Roy, to RCA Corporation. Automatic beam focusing system. 3,647,952, Cl. 178-7.2

Ballman, Albert A.; and Carruthers, John R., to Bell Telephone Laboratories, Incorporated. Growth of crack-free barium sodium niobate and related materials. 3,647,697, Cl. 252-62.9

Balon Corporation: *See*—
Adams, Ladd M., 3,647,178.
Scaramucci, Domer; and Adams, Ladd M., 3,647,179.

Baltazzi, Evan S.; Shelffo, Loren EE.; and Moduthagam, Michael, to Addressograph-Multigraph Corporation. Photoelectrostatic copier having a single station for simultaneously applying toner particles and cleaning the photoconductive medium. 3,646,866, Cl. 355-15.

Balz, Jurgen, to Blaz, Helmut, GmbH, Firma. Power driven positioning system with interrupt means upon application of a positioning force at end points of travel. 3,647,038, Cl. 192-141.

Ban, Itsuki. Magnetic tape automatic recording apparatus having antomatic fade-in and fade-out. 3,647,988, Cl. 179-100.2

Bang, Mogens W., to Stackpole Carbon Company. Linear motion variable resistor with transverse fine adjustment. 3,648,215, Cl. 338-122.

Bangor Punta Operations, Inc.: *See*—
Hurd, Stanley E.; and Fong, Leong Q., 3,647,266.

Banoczi, Joseph A. Disposable recessed cigarette tip. 3,646,944, Cl. 131-187.

Barden Corporation, The: *See*—
McKee, Lewis W., 3,647,269.

Barlow, David O., to Du Pont de Nemours, E. I., and Company. Polyvinyl alcohol coating colors. 3,647,528, Cl. 117-155.

Barlow, Gordon A.; and Glass, Marvin I., to Glass, Marvin, & Associates. Hockey game. 3,647,212, Cl. 273-85.

Barnard, Dominic Paul Edward; and Bishop, Brian L. H., to Smiths Industries Limited. Holder for a capless light bulb. 3,648,044, Cl. 240-8.16

Barnard, John D.; Gaito, Carl C.; Giedo, Gary R.; Greene, Thomas G.; Lind, James W.; Perkins, Merlyn H.; and Pross, Charles M., to International Business Machines Corporation. Computer orientated test system having digital measuring means with automatic range changing feature. 3,648,175, Cl. 324-115.

Barnes, Donald A. Method for treating textile materials. 3,647,526, Cl. 117-115.

Barnes, Gerald, to Amerace Esna Corporation. Insert for sandwich panels. 3,646,981, Cl. 151-41.7

Barnett, Allen M.; Jensen, Harold A.; and Meikleham, Virginia F., to General Electric Company. Selective uniform liquid phase epitaxial growth. 3,647,578, Cl. 148-171.

Barron, Richard H.: *See*—
Rowley, Kermit G.; and Barron, Richard H.,3,647,000.

Barte, William B.: *See*—
Wiese, Joseph A., Jr.; and Barte, William B.,3,648,257.

Bartholomew, Ralph L.: *See*—
Friedman, Arnold I.; and Bartholomew, Ralph L.,3,647,532.

Bartlett, Ronald S., to PPG Industries, Inc. Synthesis of tetramethyllead. 3,647,839, Cl. 260-437.

Bartocci, Antonio: *See*—
Serracchioli, Francesco; and Bartocci, Antonio,3,648,251.

Barzee, Verl N. Perspective drafting system. 3,646,683, Cl. 33-77.

Baskin, Yehuda: *See*—
Kuznietz, Moshe; Lander, Gerard H.; and Baskin, Yehuda,3,646,813.

Bass, Jon Dolf, to Eastman Kodak Company. Photographic element, composition and process. 3,647,439, Cl. 96-29.

Bauer, Ronald S.; Glockner, Peter W.; Keim, Wilhelm; and Mason, Ronald F., to Shell Oil Company. Ethylene oligomerization. 3,647,915, Cl. 260-683.15

Bauer, Russell E., to KDI-Bauer Corporation, mesne. Locking device. 3,646,645, Cl. 24-241.

Baugher, Dale Milton; and Hausman, Earl Thomas, to RCA Corporation. Multi-circuit hybrid module and method for making. 3,648,116, Cl. 317-101.

Baum, Wilhelm, to Siemens Aktiengesellschaft. Sintered borosilicate glass. 3,647,491, Cl. 106-54.

Baumgartner, Darrell E., to Owatonna Manufacturing Company, Inc. Speed and steering control for vehicles. 3,647,011, Cl. 180-6.48

Bausch & Lomb Incorporated: *See*—
Emmel, Henry J.; and Morgan, Thomas J., 3,647,304.

Bavers, Elliott, to Rotodyne Manufacturing Corporation. Refuse incinerating apparatus. 3,646,898, Cl. 110-14.

Bayer, Horst O.; Cook, Richard S.; and von Meyer, William C., to Rohm and Haas Company. 1,2,4-Triazole metal salt complexes. 3,647,810, Cl. 260-299.

Bays, David Edmund; and Foster, Roy Vivian, to Allen & Hanburys Limited. Novel aroyl phenethyl alcohols. 3,647,881, Cl. 260-591.

Beal, John O.: *See*—
Gray, Robert P.; and Beal, John O.,3,646,807.

Beardmore, Alfred Cyril; Cooke, Geoffrey Cyril; and Stringer, Donald Charles, to Avery, W. & T., Limited. Mechanical load measuring systems. 3,647,010, Cl. 177-230.

Beatrice, Finton J., to United States of America, Navy, mesne. Electronic angle generator. 3,648,041, Cl. 235-186.

Beaudry, Harvey James, to International Plasma Corporation. Radio frequency generator circuits and components therefor. 3,648,191, Cl. 330-192.

Beaudry, Harvey James; and Waidtlow, Robert M., to International Plasma Corporation. Polarity control electric power supply circuit. 3,648,059, Cl. 307-127.

Beausoleil, William F., to International Business Machines Corporation. High speed associative memory. 3,648,254, Cl. 340-172.5

Beausoleil, William F.; Ordemann, Fred A., Jr.; Pricer, Wilbur D.; and Vogl, Norbert G., Jr., to International Business Machines Corporation. Auxiliary storage apparatus. 3,648,255, Cl. 340-172.5

Beaver, Murray W., to Technicon Corporation. Method and apparatus for the highly accurate, automatic determination of the hematocrit of whole blood samples. 3,648,160, Cl. 324-30.

Bechet, Louis; and Bertholon, Claude, to Compagnie Generale D'Electricite. Control means for an AC-DC or DC-AC energy converter for carrying direct current energy. 3,648,148, Cl. 321-5.

Beck, Earl J., Jr., to United States of America, Navy. Dredging method employing injection and suction nozzles. 3,646,694, Cl. 37-195.

Becker, Otto Alfred. Wall units with insulation. 3,646,721, Cl. 52-618.

Beckman, Bengt Erling. Electric incandescent lamp simulating a candle flame. 3,648,095, Cl. 313-317.

Beckman Instruments, Inc.: *See*—
Cederstrand, Carl N.; and Dodson, Michael, 3,648,162.

Beckwith, Robert W. Voltage balance relay circuit. 3,648,112, Cl. 317-27.

Bedford, William A., Jr. Boat boarding step and seat. 3,647,023, Cl. 182-23.

Bednar, John S.: *See*—
Dingley, Wilfred; Bednar, John S.; and Rogers, Raymond R.,3,647,648.

Beecham Group Limited: *See*—
Hardy, Kenneth David, 3,647,780.

Beeker, Charles W.; and Crabtree, Royale R., to United States of America, Army. Helicopter sling load electrical connector. 3,647,170, Cl. 244-136.

Beereboom, John J.; Cameron, Donald P.; and Stephens, Charles R., to Pfizer Inc. Method of flavoring food by addition of benzoxepin-3-ones and benzodioxepin-3- ones. 3,647,479, Cl. 99-140.

Beers, Russel L.: *See*—
Swanson, John W.; Hartman, David A.; Beers, Russel L.; and Jamieson, Ernest J.,3,647,694.

Beggs, James E., to General Electric Company. Electron beam focusing bi-potential cathode. 3,648,096, Cl. 313-346.

Behnke, Wilbert E.: *See*—
Harris, Allan E.; and Behnke, Wilbert E.,3,646,623.

Behr, Douglas Raymond: *See—*
Rieke, James K.; Behr, Douglas Raymond; and McIntire, Otis R.,3,647,617.

Belason, E. Bruce; Castle, George K.; Crowley, Donald P.; and Morgida, Joseph V., to Avco Corporation. Fire simulation facility. 3,647,193, Cl. 263-1.

Beletsky, Naum Iosifovich; and Chepovesky, Mikhail Lvovich. Reducer head of automatic rotary-swaging machine for reducing metal-wire parts. 3,646,788, Cl. 72-8.

Belford, Bertram C., to Massey-Ferguson Services N.V. Automatically actuated vehicle indicator. 3,648,234, Cl. 340-62.

Bell, David, to BP Chemicals (U.K.) Limited. Recovery of mercury. 3,647,359, Cl. 23-2.

Bell Telephone Laboratories, Incorporated: *See—*
Ballman, Albert A.; and Carruthers, John R., 3,647,697.
Berglund, Carl Neil; and Nicollian, Edward Haig, 3,648,122.
Burton, Herbert O., 3,648,236.
Embree, Milton L.; and Huber, William R., III, 3,648,170.
Enloe, Louis H., 3,647,946.
Fabiano, Lucian Philip, Jr.; Grandmaison, John Paul; Greason, William Wallace, III; and King, Ted R., Jr., 3,647,980.
Fisher, George M. C., 3,647,406.
Fritzinger, Larry B.; and Lepselter, Martin P., 3,647,585.
Fuchs, Edward O.; and Swisher, James H., 3,647,573.
Gerstenberg, Dieter; and Smith, Frank Thomas John, 3,647,662.
Gyorgy, Ernst M.; Sherwood, Richard C.; and Van Uitert, Le Grand G., 3,648,260.
Hakki, Basil W., 3,648,120.
Hirsch, Donald, 3,648,171.
Kaminow, Ivan P., 3,647,277.
Kerwin, Robert E., 3,647,457.
Knight, Stephen,, 3,648,110.
Pleass, Charles M., 3,647,537.
Rubin, Harvey, 3,647,979.
Thomas, Edmond Joseph, 3,647,992.
Weiner, Martin Eric, 3,647,389.
Wolfe, Raymond, 3,647,538.

Belleli, Rodolfo. Floating roof for liquid storage tanks, particularly for the storage of liquid petroleum products. 3,647,113, Cl. 220-26.

Bellettiere, Ronald: *See—*
Thron, John E.; Woods, William E.; Bellettiere, Ronald; and Stein, Howard,3,648,252.

Bellinger, Kenneth P.; and Conoby, Joseph F., to Conversion Chemical Corporation. Composition for cleaning aluminum and method utilizing same. 3,647,698, Cl. 252-79.4

Ben Daniel, David J.; Morgan, John R.; and Fielding, John O., to General Electric Company. Selective audio playback apparatus. 3,647,223, Cl. 274-9.

Benckiser-Knapsack GmbH: *See—*
Riehm, Theodor; and Gehrig, Oskar, 3,647,369.

Benda, Alexander Z.: *See—*
Woessner, Richard; and Benda, Alexander Z.,3,646,886.

Bender, Warren G.: *See—*
Foulkes, John D.; and Bender, Warren G.,3,647,993.

Bendix Corporaion, The: *See—*
Zipin, Richard B.; and Zalusky, James T., 3,647,302.

Bendix Corporation, The: *See—*
Bailey, Knight V., 3,647,963.
Boyer, Peter W., 3,646,850.
Burnett, Richard T., 3,647,030.
Burnett, Richard T., 3,647,031.
Cripe, Maxwell L., 3,646,758.
Dombeck, Edward K., 3,647,032.
Hughes, Harold W.; and Shutt, Paul B., 3,646,759.
Klein, Bruce W., 3,647,033.
Kowalski, Daniel C., 3,648,039.
Kramer, Charles J., Jr., 3,647,303.
Nagy, John R., 3,646,917.
Nagy, John R.; and Rachel, Todd L., 3,646,918.
Owens, Abner, Jr.; and Yurasek, John F., 3,648,231.
Perry, Adolphus R., 3,648,228.
Rachel, Todd L., 3,646,915.
Ratcliff, Henry K., 3,648,188.
Shields, Martin A., 3,646,852.
Sullivan, Wayne A.; and Scolaro, Donald A., 3,648,067.
Wieger, George F., 3,647,034.

Benjamin, John; and Jones, John Michael, to United Kingdom of Great Britain and Northern Ireland, Minister of Technology in Her Britannic Majesty's Government of the. Aircraft landing radio guidance receivers. 3,648,288, Cl. 343-108.

Bennett, Moreland P., to General Electric Company. Method of joining copper braid to aluminum and the joint formed thereby. 3,648,014, Cl. 219-118.

Bennett, William A.: *See—*
Sherman, Warren S.; Troth, Dennis L.; and Bennett, William A.,3,646,755.

Benskin, Glen D.: *See—*
Le Vantine, Allan D.; and Benskin, Glen D.,3,648,045.

Benslay, Roger M.: *See—*
Jones, Arthur L.; and Benslay, Roger M.,3,647,910.

Benson, Sidney W.; Haugen, Gilbert R.; and Jackson, Roland S., to Stanford Research Institute. Detection device. 3,647,387, Cl. 23-232.

Berendt, Gerald C.; and Melanson, Leslie B. Link separator. 3,646,637, Cl. 17-1.

Berg Manufacturing Company, The: *See—*
Cannella, Joseph L., 3,646,734.

Berger, Alfred: *See—*
Deflorin, Alberto; Abel, Heinz Reinach; Berger, Alfred; Casty, Richard; and Toepfl, Rosemarie,3,647,728.

Berger, Carl, to McDonnell Douglas Corporation. Solid-fluid battery. 3,647,542, Cl. 136-6.

Berger, Louis: *See—*
Rosenweig, Ronald E.; and Resnick, Joseph,3,648,269.

Berglund, Carl Neil; and Nicollian, Edward Haig, to Bell Telephone Laboratories Incorporated. Metal-insulator-metal solid state rectifier. 3,648,122, Cl. 317-234.

Bergum, Bernard C.; and Svardal, Per S., to ESB Incorporated. Method of hydrating a battery plaque impregnated with metal nitrate in a hydroxide solution and subsequent recovery of nitrate byproduct as crystals. 3,647,586, Cl. 136-20.

Berman, Irwin, to Foster Wheeler Corporation. Multi-layer pressure vessel. 3,647,103, Cl. 220-3.

Bernardi, Luigi; Bosisio, Germano; and Temperilli, Aldemio, to Societa' Farmaceutici Italia. Process for the preparation of lumilysergic acid derivatives. 3,647,655, Cl. 204-158.

Bernatt, Joseph; and Gutmann, John T., to S&C Electric Company. Polyphase disconnecting switch for high voltage circuit having a conductor at each apex of a triangle. 3,647,996, Cl. 200-48.

Bernhardt, Gunther: *See—*
Buning, Robert; Bernhardt, Gunther; Bierwirth, Egon; and Trautvetter, Werner,3,647,402.

Bernstein, Jack: *See—*
Wieslogle, Frederick Y.; and Bernstein, Jack,3,647,781.

Berry, Alvin F., to General Electric Company. Aromatic superpolyester-styrene polymer melt stabilized composition. 3,647,921, Cl. 260-873.

Berry, Francis Douglas; and Blyther, Stanley Charles, to LR Industries Limited. Apparatus for the autogenous bonding of contraceptive sheaths. 3,647,601, Cl. 156-511.

Bersin, Richard L., to International Plasma Corporation. Method and apparatus for reacting ionized gas with a non-gaseous substance. 3,647,676, Cl. 204-312.

Bertholon, Claude: *See—*
Bechet, Louis; and Bertholon, Claude,3,648,148.

Bertin & Cie: *See—*
Croix-Marie, Francis Marie Jean; and Grignon, Robert Georges, 3,647,018.

Bertozzi, Eugene R., to Thiokol Chemical Corporation. Method of making hydroxyl-terminated polysulfide polymers. 3,647,766, Cl. 260-79.

Berzin, Gunard Valdemarovich; Kalnin, Arvid Yanovich; Sushkov, Alexandr Fedorovich; Sikrupsky, Voldemar Petrovich; Ziemelis, Andris Eduardovich; Soloviev, Boris Fedorovich; Leeniex, Karl Mikhailovich; Sovetin, Vladimir Kirilovich; Gulbis, Yan Karlovich; Dalbinsh, Yan Yanovich; Priede, Bruno Andreevich; Upman, Karl Kristapovich; Muzhits, Vitold Iosifovich; Junga, Yan Petrovich; Krogzem, Ivar Arnoldovich; Greitan, Zigurd Boleslavovich; and Rotsen, Karl Arturovich. Process for packing and drying solid wood and a plant for accomplishing same. 3,646,687, Cl. 34-13.8

Bettin, Hubertus, to Olympia Werke AG. Numerical display tubes controlled by pulses produced by voltage inverter and directed by switch device to each tube in succession. 3,648,102, Cl. 315-133.

Betty, Roy J.: *See—*
Malec, Robert E.; and Betty, Roy J.,3,647,378.

Betz Laboratories, Inc.: *See—*
Shema, Bernard F.; Brink, Robert H., Jr.; and Swered, Paul, 3,647,703.

Beyl, Jean Joseph Alfred. Safety ski binding. 3,647,235, Cl. 280-11.35

Bhutani, Harish K.; and Kendall, Giles A., to Menasco Manufacturing Company. Variable damping liquid spring. 3,647,199, Cl. 267-124.

Bialous, Charles A., to General Electric Company. High temperature molding flame retardant polycarbonate composition. 3,647,747, Cl. 260-45.75

Bialy, Jerzy J.: *See—*
Sweeney, William M.; and Bialy, Jerzy J.,3,647,404.

Biancardi, Frank R.: *See—*
Melikian, Gorken; and Biancardi, Frank R.,3,648,194.

Biber, Conrad H., to Polaroid Corporation. Electronic flash lamp control network. 3,646,865, Cl. 95-11.5

Bice, Claude W.: *See—*
Tollefson, Charles I.; and Bice, Claude W.,3,647,486.

Bickerstaff Clay Products Company, Inc.: *See—*
Brooks, Marion E., 3,647,093.

Biddick, Royce E., to Gould Inc. Low maintenance batteries having electrolyte reservoir in vapor contact with the cells. 3,647,543, Cl. 136-6.

Bienek, Gunter. Clearer for a carpet sweeper brush. 3,646,629, Cl. 15-48.

Bienvenue, Louis L.: *See—*
Wetch, Joseph R.; Sudar, Seymour; and Bienvenue, Louis L.,3,647,394.

Bierwirth, Egon: *See—*
Buning, Robert; Bernhardt, Gunther; Bierwirth, Egon; and Trautvetter, Werner,3,647,402.

Bigelow, Edward J.: *See—*
Middelkoop, James H.; and Bigelow, Edward J.,3,647,226.

Bille, Heinz, to Scheele, Walter, KG. Distributing valve arrangement. 3,647,326, Cl. 417-517.

Bills, James L., to Monsanto Company. Cuprous sulfonate salt complexes. 3,647,840, Cl. 260-438.1

Binkley, Carl R.; and Farrell, Robert G., to Sperry Rand Corporation. Power transmission valve with detent. 3,646,968, Cl. 137-625.64

Binz, Robert D.: *See—*
Davies, Norman; and Binz, Robert D.,3,648,204.

Bio-Dynamics, Inc.: *See—*
Hinchman, Gerald V.; Sommerville, James L.; and Schmitz, William D., 3,646,817.

Biocor Corporation: *See—*
Stager, Francis W.; and Minor, Robert N., 3,647,111.

Birnbaum, Milton; and Fincher, Curtis L., to United States of America, Air Force. Continuous-wave non-spiking single mode laser. 3,648,192, Cl. 331-94.5

Bishop, Brian L. H.: *See—*
Barnard, Dominic Paul Edward; and Bishop, Brian L. H.,3,648,044.

Bjorn-Larsen, Knut L. Method of forming friction protrusions on elastic, open mesh garment fabric. 3,647,505, Cl. 117-37.

Black Clawson Company, The: *See—*
Artiano, Adrian; and Brown Robert M., 3,647,151.

Black, John C.; and Buckley, Frederick, to International Business Machines Corporation. All transistor logic employing transistors of a single conductivity type. 3,648,061, Cl. 307-218.

Blackhawk Metal Products, Inc.: *See—*
Grafton, Jim R.; Wilkins, Glenn E.; and Murphy, Joseph F., 3,646,928.

Blanchard, Joseph Louis, to Compagnie Internationale pour l'Informatique. Magnetic articles. 3,647,400, Cl. 29-191.

Blanton, Elmer L.: *See—*
Brown, Marion L., Jr.; Green, Albert W.; and Blanton, Elmer L.,3,647,412.

Blau, Hans: *See—*
Meyer, Erwin; Brendel, Klaus-Dieter; Blau, Hans; and Stoof, Gerhard,3,647,022.

Blaz, Helmut, GmbH, Firma: *See—*
Balz, Jurgen, 3,647,038.

Blessings, Inc.: *See—*
Zipf, Frederick W., III, 3,646,624.

Bleuer, Keith T. Tissue dispenser having resiliently biased follower. 3,647,114, Cl. 221-59.

Blewitt, Donald Joseph; and Schmidt, Otto Karl, to AMF Incorporated. Reconstituted tobacco. 3,646,943, Cl. 131-140.

Blitchington, Frank H., Jr.; and Harris, Richard A., to Western Electric Company, Incorporated. T.V. -aided flaw detection using rotating image techniques. 3,647,961, Cl. 178-7.85

Bloch, James E., to Control Data Corporation. Winding fixture. 3,646,658, Cl. 29-205.

Blohm, Thomas R.: *See—*
Palopoli, Frank P.; Blohm, Thomas R.; and Kariya, Takashi,3,647,863.

Bloom Engineering Company, Inc.: *See—*
Brungraber, Louis E.; and Rudin, Walter, 3,647,194.

Blues, Ernest T.: *See—*
Bryce-Smith, Derek; and Blues, Ernest T.,3,647,720.

Bluestein, Bernard R.; and Solomon, Jack M., to Witco Chemical Company, Inc. Vapor phase process for production of N,N' disubstituted piperazines. 3,647,795, Cl. 260-268.

Blumenthal, Jack H., to International Flavors & Fragrances Inc. Novel fragrance materials and processes. 3,647,880, Cl. 260-587.

Blyther, Stanley Charles: *See—*
Berry, Francis Douglas; and Blyther, Stanley Charles,3,647,601.

Bodenseewerk Geratetechnik GmbH: *See—*
Bader, Gottfried, 3,648,033.

Bodle, William W.; and Anderson, Philip J., to Institute of Gas Technology. Liquid storage chamber. 3,646,765, Cl. 61-0.5

Bogdan, John R.: *See—*
Farmer, Alonzo; and Bogdan, John R.,3,647,383.

Boggs, Elizabeth M.: *See—*
Fitzpatrick, Hugh M.; Neville, James J.; Thompson, John; and Boggs, Fitzhugh W.,3,648,226.

Boggs, Fitzhugh W.: *See—*
Fitzpatrick, Hugh M.; Neville, James J.; Thompson, John; and Boggs, Fitzhugh W.,3,648,226.

Boleky, Edward Joseph; and Burns, Joseph Richard, to RCA Corporation. Fabrication of semiconductor devices. 3,646,666, Cl. 29-577.

Boller, John A.: *See—*
. Flohr, William P., Jr.; and Boller, John A.,3,646,710.

Bolton, Anthony Peter, to Union Carbide Corporation. Process for improving the activity of zeolitic catalyst compositions. 3,647,717, Cl. 252-455.

Bolton, Hugh Robert: *See—*
Laithwaite, Eric Roberts; and Bolton, Hugh Robert,3,648,084.

Bonnar, John, to National Research Development Corporation. Female incontinence device. 3,646,929, Cl. 128-1.

Bonneau, Andre; and Bontems, Henri. Fluid flow control valve. 3,647,175, Cl. 251-61.

Bonnema, Jentje; and Pijpers, Emanuel M. J., to Stamicarbon N.V. Preparation of macromolecular formaldehyde polymers. 3,647,754, Cl. 260-67.

Bonnerot, Jacques; and Paradan, Henri, to U.S. Philips Corporation. Cryostat. 3,646,775, Cl. 62-216.

Bontems, Henri: *See—*
Bonneau, Andre; and Bontems, Henri,3,647,175.

Booker, Clyde A., Jr.; and Thompson, Francis T., to Westinghouse Electric Corporation. System for phasing recorded information with input signals. 3,647,953, Cl. 178-6.6

Booker, Clyde A., Jr.; and Thompson, Francis T., to Westinghouse Electric Corporation. Continuous display on intermittent video signals. 3,647,954, Cl. 178-6.6

Boos, Donald L.; and Metcalfe, Joseph E., III, to Standard Oil Company, The (Ohio). Electrical capacitor employing paste electrodes. 3,648,126, Cl. 317-230.

Boothe Airside Services, Inc.: *See—*
Russell-French, Harry M., 3,647,100.

Boragine, Carlo: *See—*
Bruengger, Heinrich; and Boragine, Carlo,3,647,466.

Borch, Richard F.: *See—*
Kreevoy, Maurice M.; Borch, Richard F.; and Hutchins, Jonathan E. C.,3,647,890.

Borden, Douglas G.; Unruh, Cornelius C.; and Merrill, Stewart H., to Eastman Kodak Company. Lithographic printing plate prepared from linear light-sensitive polymers containing the styryl ketone group. 3,647,444, Cl. 96-33.

Borden Inc.: *See—*
Snow, Harold Forest, 3,646,638.

Borg-Warner Corporation: *See—*
Schlott, Richard J.; Hoeg, Donald F.; and Pendleton, John F., 3,647,803.

Bosch, Robert, G.m.b.H.: *See—*
Soehner, Gerhard; and Hoehne, Gerd, 3,648,155.
Vogel, Erich; Ulimann, Gunter; and Pfluger, Gerhard, 3,646,820.
Wilke, Gerhard; Schnell, Gerhard; and Hoyer, Karl, 3,647,014.

Bosch, Robert, Photokino GmbH: *See—*
Ackermann, Karl, 3,648,104.

Bosisio, Germano: *See—*
Bernardi, Luigi; Bosisio, Germano; and Temperilli, Aldemio,3,647,655.

Bossert, Friedrich; and Vater, Wulf, to Farbenfabriken Bayer Aktiengesellschaft. N-Alkyl-1,4-dihydropyridines. 3,647,807, Cl. 260-295.5

Boswell, George A., Jr., to Du Pont de Nemours, E. I., and Company. 6,6-Difluoro-13β-ethyl-17α-substituted-17β- hydroxy-4-gonen-3-ones and their lower esters. 3,647,830, Cl. 260-397.4

Boudot, W. Donald; and Carl, Robert C., to Dover Corporation. Shut-off valve assembly. 3,647,182, Cl. 251-361.

Bouzard, Daniel: *See—*
Weber, Abraham; Frossard, Jacques Jean; and Bouzard, Daniel,3,647,877.

Bowen, Dennis Herbert; Mattingley, Neville John; and Sambell, Ronald Alfred James, to United Kingdom Atomic Energy Authority. Apparatus for coating fibres. 3,646,908, Cl. 118-304.

Bower, Kenneth F., to United States of America, National Aeronautics and Space Administration. Buffered analog converter. 3,648,275, Cl. 340-347.

Bowers, Raymond S., Jr.: *See—*
Watson, Earnest B., 3,646,833.

Bowlby, James F. G. Single use film developer. 3,646,873, Cl. 95-89.

Bowlby, James F. Photographic film developing apparatus. 3,646,872, Cl. 95-89.

Boyd, Eugene J., to United States Tobacco Company. Reciprocating twister pipe cleaner machine. 3,646,743, Cl. 57-5.

Boyd, Woodrow. Motor powered plow. 3,647,005, Cl. 172-259.

Boydell, Kenneth Raymond, to Dowty Technical Developments Limited. Hydraulic apparatus. 3,647,321, Cl. 417-222.

Boyer, Peter W., to Bendix Corporation, The. Detent mechanism for brake booster. 3,646,850, Cl. 91-391.

Boyter, Walter C.: *See—*
Murray, Coyt E.; and Boyter, Walter C.,3,646,746.

Bozek, John S., to Continental Can Company, Inc. Trimming head for metal cans. 3,646,840, Cl. 82-82.

Bozoian, Michael, to Ford Motor Company. Wide-band noninductive frequency doubler. 3,648,062, Cl. 307-220.

BP Chemicals, Limited: *See—*
Hill, Thomas, 3,647,709.

BP Chemicals (U.K.) Limited: *See—*
Bell, David, 3,647,359.

Braas, Alfred, to Armaturenwerk Niedersheld GmbH. Quick-acting valve with rocker-type operating button. 3,646,958, Cl. 137-553.

Brackenridge, David R.: *See—*
Dubeck, Michael; and Brackenridge, David R.,3,647,883.

Brad Ragan, Inc.: *See—*
Morgan, Harvey E.; Suttle, Theodore; and Schenck, Jackson C., 3,646,984.

Bradley, Chester D.; and Tate, Malcolm C., to Emery, A. H., Company, The. Load cell with high cross loading capacity. 3,646,854, Cl. 92-98.

Bradley Washfountain Co.: *See—*
Smart, Edwin Allen, 3,646,966.

Bradley, William E.: *See—*
Timm, Gerald W.; and Bradley, William E.,3,646,940.

Braginetz, Paul A., to Morris, Philip, Incorporated. Adjustable folding razor. 3,646,672, Cl. 30-32.

Brainard, Norman R.; and Holl, William H., to General Motors Corporation. Electronic cruise control system. 3,647,017, Cl. 180-150.

Brannan, Mary Ann F.: *See—*
Roberts, Earl J.; Rowland, Stanley P.; and Brannan, Mary Ann F.,3,647,352.

Brendel, Klaus-Dieter: *See—*
Meyer, Erwin; Brendel, Klaus-Dieter; Blau, Hans; and Stoof, Gerhard,3,647,022.

Brennan, Martin J.: *See—*
James, Peter; Brennan, Martin J.; and Kappes, Ben E.,3,647,973.

Brenner, William C.: *See—*
Heller, Paul R.; Brenner, William C.; and Philossky, Harold M.,3,647,932.

Breslow, Jeffrey D., to Glass, Marvin, & Associates. Target game for rolling missile. 3,647,216, Cl. 273-123.

Breu, Hanspeter: *See—*
Hofling, Erich; and Breu, Hanspeter,3,647,658.

Brewitz, Frederick G., to Minnesota Mining and Manufacturing Company. Developer. 3,648,019, Cl. 219-386.

Bridge, John A.: *See—*
Speech, Steven R.; Opie, Joseph W.; and Bridge, John A.,3,647,472.

Brigham, Kristin; and Vickery, Ronald C., to Ceramco, Inc. Dental prosthesis model base composition containing calcium fluoride. 3,647,488, Cl. 106-35.

Brill-Edwards, Harry W.: *See—*
Milidantri, Thomas; and Brill-Edwards, Harry W.,3,647,517.

Brink, Robert H., Jr.: *See—*
Shema, Bernard F.; Brink, Robert H., Jr.; and Swered, Paul,3,647,703.

Bristol-Myers Company: *See—*
Crast, Leonard Bruce, Jr., 3,647,789.
Schmitz, Henry, 3,647,779.

British Aircraft Corporation: *See—*
Allwright, Eric Sydney; and Godwin, Roy Charles, 3,647,169.

British Aircraft Corporation Limited: *See—*
Perrett, Brian Raymond, 3,648,042.
Woodcock, Terence Keith, 3,648,180.

British Petroleum Company Limited, The: *See—*
Groszek, Aleksander Jerzy, 3,647,689.

British Resin Products Limited: *See—*
Scotland, John Louis, 3,647,613.

Brizzi, Anthony F.: *See—*
Nolin, Roger J.; and Brizzi, Anthony F.,3,647,252.

Brodbeck, John J., to Chevron Research Company. Equilibration of lower alkyl substituted polyalkyl aromatic hydrocarbons with reduced disproportionation. 3,647,898, Cl. 260-668.

Brodnitz, Michael H.; and Pascale, John V., to International Flavors & Fragrances Inc. Method of making aliphatic di- and trisulfide flavoring materials. 3,647,481, Cl. 99-140.

Brodnyan, John G., to Rohm and Haas Company. Pigmented finishes for fibrous articles. 3,647,735, Cl. 260-29.4

Brook, John W.; and Hoch, Samuel, to Tenneco Chemicals, Inc. Stabilized vinyl resin compositions. 3,647,748, Cl. 260-45.75

Brooking, Ivor Harold: *See—*
Chilman, John Alfred; Brooking, Ivor Harold; Chilman, John Alfred; and Brooking, Ivor Harold,3,647,320.
Chilman, John Alfred; Brooking, Ivor Harold; Chilman, John Alfred; and Brooking, Ivor Harold,3,647,320.

Brooks, Marion E., to Bickerstaff Clay Products Company, Inc. Apparatus for handling aligned rows of objects. 3,647,093, Cl. 214-8.5

Brown & Root, Inc.: *See—*
Rochelle, William R.; and Wycoff, Ronald Lee, 3,646,947.

Brown, Fred P., Jr., to Packaging Industries, Inc. Apparatus for forming containers. 3,647,335, Cl. 425-143.

Brown, Fred; and Obermeyer, James Henry, to Union Tank Car Company. Latching mechanism. 3,647,251, Cl. 292-111.

Brown, Harold J.; and Winpisinger, Joseph L., to Lorain Products Corporation. Polyphase inverter circuit. 3,648,149, Cl. 321-5.

Brown, Howard W.: *See—*
Clark, Thomas J.; and Brown, Howard W.,3,647,511.

Brown International Corporation: *See—*
Douglas, Peter L., 3,647,475.

Brown, Marion L., Jr.; Green, Albert W.; and Blanton, Elmer L., to Mississippi Chemical Corporation. Process for producing ammonium nitrate-calcium carbonate mixed fertilizer prills and resulting product. 3,647,412, Cl. 71-59.

Brown Robert M.: *See—*
Artiano, Adrian; and Brown Robert M.,3,647,151.

Brown, William D.: *See—*
Carrillo, Gilberto; and Brown, William D.,3,647,645.

Brown, William M. Pivotal locking clasp. 3,647,250, Cl. 292-67.

Bruckert, Eugene J., to Motorola, Inc. Active filter. 3,648,190, Cl. 330-107.

Bruengger, Heinrich; and Boragine, Carlo, to Ciba Limited. Photographic material for the silver dyestuff bleaching process. 3,647,466, Cl. 96-99.

Brungraber, Louis E.; and Rudin, Walter, to Bloom Engineering Company, Inc. Protective refractory member. 3,647,194, Cl. 263-6.

Brunmayer-Schilt, Willy: *See—*
Medema, Dirk; Brunmayer-Schilt, Willy; and Van Helden, Robert,3,647,908.

Brunswick Corporation: *See—*
Cole, William J.; and Rytina, Anton W., 3,646,909.

Bryant, Furnie S.: *See—*
Ganong, William L., Jr.; Bryant, Furnie S.; Neill, Henry R.; and Davies, Robert G.,3,648,027.

Bryant, Richard W.; and Tu, George K., to Cogar Corporation. High-speed sense latch circuit. 3,648,079, Cl. 307-289.

Bryce-Smith, Derek; and Adcock, Stuart Samuel, to Ethyl Corporation. Process for the oxidation of hydrocarbons. 3,647,715, Cl. 252-429.

Bryce-Smith, Derek; and Blues, Ernest T. Metals and metal compounds. 3,647,720, Cl. 252-476.

Buchanan, James B., to Du Pont de Nemours, E. I., and Company. Substituted O-carbamylhydroxamates. 3,647,861, Cl. 260-481.

Buchel, Karl Heinz: *See—*
Draber, Wilfried; Buchel, Karl Heinz; and Plempel, Manfred,3,647,816.

Buck, Daniel C.; and Schellenberg, James M., to Westinghouse Electric Corporation. Temperature independent yig filter. 3,648,199, Cl. 333-73.

Buck, Willard E.; and Holland, Thomas E., to Technical Operations, Incorporated. Laser beam flying spot scanner. 3,647,956, Cl. 178-7.6

Buckbee-Mears Company: *See—*
Olson, Roger A., 3,647,642.

Buckingham, Robert L.; and Herd, Harold H., to International Business Machines Corporation. Method for producing photographic emulsion coatings. 3,647,501, Cl. 117-34.

Buckley, Frederick: *See—*
Black, John C.; and Buckley, Frederick,3,648,061.

Budd Company, The: *See—*
Eggert, Walter S., Jr.; and Frankel, Michael S., 3,647,168.
Marchetti, John W.; and Kiser, Herbert H., 3,648,189.

Budris, Allan R.; McGowan, Frank J.; Evans, Lewis M.; Wayne, Theodore J.; Lithen, Eric E.; and Darcy, Charles B., to Worthington Corporation. Watercraft especially useful for the recovery of oil. 3,646,901, Cl. 114-0.5

Bufton, Richard G.; Semancik, John R.; and King, George G., to Diamond Shamrock Corporation. Reaction products of polynitriles, water and amines. 3,647,769, Cl. 260-85.5

Bulat, John Ivan; and Jaun, Rudolph, to Ontario Paper Company Limited, The. Log bundle aligner. 3,647,092, Cl. 214-6.

Buls, Vernon W.; and Grimsby, F. Norman, to Shell Oil Company. Salt drying by plural stage azeotropic distillation with plural entrainers. 3,647,639, Cl. 203-14.

Bump, Edward L., to Vaughan Mfg. Co. Towel dispenser. 3,647,159, Cl. 242-55.53

Bunaweske Huls Gesellschaft mit beschrankter Haftung: *See—*
Schaum, Helmut, 3,647,768.

Bunch, Raymond S.; and Sanger, Richard B., to General Electric Company. Device for varying the inductance of a helical inductor. 3,648,205, Cl. 336-20.

Buning, Robert; Bernhardt, Gunther; Bierwirth, Egon; and Trautvetter, Werner, to Dynamit Nobel AG. Galvanically metallized objects having a post- chlorinated polyethylene substrate and process of producing same. 3,647,402, Cl. 29-195.

Bunker-Ramo Corporation, The: *See—*
Cowmeadow, Richard R., 3,648,222.
Metz, Robert Lee; and Greenblum, Carl, 3,648,270.

Burckhardt, Chr.: *See—*
Burckhardt, Christoph; and Glaser, Walter, 3,646,639.

Burckhardt, Christoph; and Glaser, Walter, to Burckhardt, Chr. Porcupine rollers. 3,646,639, Cl. 19-97.

Burggraf, Klaus: *See—*
Reifenhauser, Fritz; Reifenhauser, Hans; and Burggraf, Klaus,3,647,329.

Burkart, Joseph A.; and O'Connell, Gerald A. Golf practice swing weight. 3,647,220, Cl. 273-194.

Burlington Industries, Inc.: *See—*
Abe, Fujio; and Crawford, Clifford R., 3,648,026.
Ganong, William L., Jr.; Bryant, Furnie S.; Neill, Henry R.; and Davies, Robert G., 3,648,027.
MacDonald, John Clifford, 3,647,587.

Burndy Corporation: *See—*
Tillmann, Hans Peter; and Lerchs, Erik, 3,648,221.

Burnett, Richard T., to Bendix Corporation, The. Spring-applied disc brake. 3,647,030, Cl. 188-72.3

Burnett, Richard T., to Bendix Corporation, The. Parking brake actuator for disc brakes. 3,647,031, Cl. 188-72.6

Burns, Carmen D., to Texas Instruments, Incorporated. Step and repeat photomask and method of using same. 3,647,445, Cl. 96-35.

Burns, Eugene A.: *See—*
Lubowitz, Hyman R.; Kendrick, William P.; Jones, John F.; Thorpe, Richard S.; and Burns, Eugene A.,3,647,529.

Burns, Joseph Richard: *See—*
Boleky, Edward Joseph; and Burns, Joseph Richard,3,646,666.

Burroughs Corporation: *See—*
Dodds, Thomas J., Jr.; Eagleson, Clegg; and Gibson, Harold F., 3,648,245.
Kupsky, George A., 3,648,093.
Shah, Gautham C., 3,647,128.

Burrows, Alan A.; and Lehde, Henry C., to McDonnell Douglas Corporation. Pulse coded vehicle guidance system. 3,648,229, Cl. 340-26.

Burt, Cortland Russell; and Ciavarri, Peter Anthony, to Du Pont de Nemours, E. I., and Company. Direct positive emulsions containing iodide ions and a sensitizing dye. 3,647,455, Cl. 96-64.

Burtis, Wilson A., to DeLaval Turbine California, Inc. Tubing coupling. 3,647,246, Cl. 285-114.

Burton, Herbert O., to Bell Telephone Laboratories, Incorporated. Decoding method and apparatus for bose- chaudhurihocquenghem codes. 3,648,236, Cl. 340-146.1

Burton, Roy Harold: *See—*
Baldwin, Tony Lewis; and Burton, Roy Harold,3,646,745.

Busch, Carl Wilhelm; and Scheer, Kurt, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Apparatus for displaying bearing markers on a radar screen. 3,648,283, Cl. 343-5.

Bush Boake Allen Limited: *See—*
Curtis, Anthony John; Jaggers, Brian George; and Janes, John Francis, 3,647,847.

Bush, Walter M., to Eastman Kodak Company. Developers for diffusion transfer film units. 3,647,436, Cl. 96-3.

Bushman, Bliss M.; and Whistler, Wayne J., to Perkin-Elmer Corporation, The. Sensitivity control for mass spectrometer. 3,648,047, Cl. 250-41.9

Buss AG: *See—*
Gresch, Walter; Pilch, Horst; and Ruttener, Erwin, 3,647,493.

Butler, Robert John, to RCA Corporation. Color phaser for television video signals. 3,647,965, Cl. 178-69.5

Butter, Stephen A., to Mobil Oil Corporation. Method of direct generation of manganese (III) solution from manganese (II) solution. 3,647,835, Cl. 260-429.

Buttweiler, Thomas B.; and Titus, Joseph S., to Honeywell Inc. Optical detector with radiant energy absorbing chamber. 3,648,056, Cl. 250-239.

Bytrex, Inc.: *See—*
Pugnaire, Jean-Pierre A., 3,646,809.

Cabot Corporation: *See—*
Menashi, Jameel; and Troiano, Paul F., 3,647,685.

Cade, Ronald L.; and Vince, Michael A., to Xerox Corporation. Development apparatus for latent electrostatic images. 3,646,910, Cl. 118-637.

Caesar, Philip D.; Haag, Werner O.; and Wise, John J., to Mobil Oil Corporation. Isoparaffin-olefin alkylation with crystalline zeolite catalysts at low isoparaffin to olefin ratios. 3,647,916, Cl. 260-683.43

Cahen, Olivier; Picquendar, Jean-Edgar; and Pircher, Georges, to Compagnie Francaise Thomson Houston-Hotchkiss Brandt. System and method for positioning a wafer coated with photoresist and for controlling the displacements of said wafer in a scanning electron apparatus. 3,648,048, Cl. 250-49.5

Cahill, Michael R., to Marbelite Company, Inc., The. Optical systems. 3,648,235, Cl. 340-110.

Calligaris, Ennio; and Rossello, Mario, to Societa per Azioni Ferrania. Electroless deposition of Ni or Co on light- generated Ag nuclei. 3,647,450, Cl. 96-48.

Caltagirone, Saverio, to General Electric Company. Apparatus for starting and operating electric discharge lamps. 3,648,207, Cl. 336-206.

Calzaferri, Hans; Kunz, Werner; Schwemmer, Martin W.; and Wyler, Max, to Triatex International AG fur textile Forschung und Entwicklung. Method and apparatus for processing cellulose- containing textiles with the vapors from an azeotropic liquid comprising an acidic catalyst. 3,647,353, Cl. 8-116.3

Cameron, Donald P.: *See—*
Beereboom, John J.; Cameron, Donald P.; and Stephens, Charles R.,3,647,479.

Cameron Iron Works, Inc.: *See—*
Jones, Marvin R., 3,646,962.

Campbell, Richard B. Table with folding legs. 3,646,895, Cl. 108-118.

Canadian Industries Limited: *See—*
Worndl, John, 3,646,856.

Canadian Patents and Development Limited: *See—*
Dawson, Peter S. S., 3,647,633.
Dingley, Wilfred; Bednar, John S.; and Rogers, Raymond R., 3,647,648.

Cancel, Luis E.; Rivera-Ortiz, Jose Manuel; and Garcia-Rivera, Francisco, to Commonwealth of Puerto Rico. Machine for separating coffee beans and berries from trash material. 3,647,062, Cl. 209-3.

Canevari, Roger: *See—*
Regnier, Gilbert; Canevari, Roger; and Laubie, Michel,3,647,794.

Cannella, Joseph L., to Berg Manufacturing Company, The, mesne. Emergency filter for fluid braking systems. 3,646,734, Cl. 55-314.

Cannon Kabushiki Kaisha: *See—*
Hanada, Hiroshi; Kitajima, Nobuo; and Masaki, Tatsuo, 3,647,427.

Canon Camera Kabushiki Kaisha: *See—*
Hanada, Hiroshi; and Kitajima, Nobuo, 3,647,430.

Canon Kabushiki Kaisha: *See—*
Sato, Jiro, 3,647,204.

Caplan, Sandor: *See—*
Klein, Richard Ira; and Caplan, Sandor,3,647,280.

Capossela, Anthony C.: *See—*
Dame, Charles, Jr.; Stinson, William S., Jr.; and Capossela, Anthony C.,3,647,474.

Carborundum Company, The: *See—*
Dessureault, Jean-Marie, 3,647,384.
McMurtry, Carl H., 3,647,558.

Carey, E. A., Pipe Company: *See—*
Doppelt, Max J., 3,646,941.

Carl, Robert C.: *See—*
Boudot, W. Donald; and Carl, Robert C.,3,647,182.

Carlson, Gordon A., to PPG Industries, Inc. Purification of brine. 3,647,653, Cl. 204-130.

Carnel, Alain, to Compagnie des Compteurs. Device for converting two magnitudes into a number of pulses proportional to the integral of their product. 3,648,182, Cl. 328-160.

Carnevalino, Ernest, to Continental Can Company, Inc. Photographic bag. 3,647,134, Cl. 229-55.

Carney, Richard William James, to Ciba Corporation. 2-Amino-4-aryl-3,4-dihydroquinolines. 3,647,802, Cl. 260-288.

Caroli, Italo, to DMS Industries Limited. Stapler device. 3,646,801, Cl. 72-410.

Caron, Paul R., to United States of America, National Aeronautics and Space Administration. Logarithmic function generator utilizing an exponentially varying signal in an inverse manner. 3,648,043, Cl. 235-197.

Carr, Albert A.; Meyer, Donald R.; Carr, Albert A.; Meyer, Donald R.; and Klein, Georg Anton, to Richardson-Merrell Inc. Ciba-Geigy AG. 6-Chloro-2,3-dihydrospiro(napthalene-1(7H), 3-piperidine)-2,4,6'-triones piperidine)-2,4,6', triones Pigments of the perylene tetraboy d dimide series. 3,647,797, Cl. 260-281.

Carr, Albert A.: *See—*
Carr, Albert A.; Meyer, Donald R.; Carr, Albert A.; Meyer, Donald R.; and Klein, Georg Anton,3,647,797.

Carriere, Russell F., to Pettibone Corporation. Interposable mast. 3,647,099, Cl. 214-674.

Carrillo, Gilberto; and Brown, William D., to Rohr Corporation. Method for selective anodizing of perforated panels. 3,647,645, Cl. 204-15.

Carruthers, John R.: *See—*
Ballman, Albert A.; and Carruthers, John R.,3,647,697.

Carter, William C.; Duke, Keith A.; and Jessep, Donald C., Jr., to International Business Machines Corporation. System for translating to and from single error correction double error detection hamming code and byte parity code. 3,648,239, Cl. 340-146.1

Cassidy, Donald J., to Ford Motor Company. Ceramic regenerator seals. 3,647,228, Cl. 277-96.

Castanis, George. Multi-image mirror. 3,647,283, Cl. 350-293.

Castle, George K.: *See—*
Belason, E. Bruce; Castle, George K.; Crowley, Donald P.; and Morgida, Joseph V.,3,647,193.

Castrucci, Paul P.; Grochowski, Edward G.; North, William D.; and Palfi, Thomas L., to International Business Machines Corporation. Common emitter transistor integrated circuit structure. 3,648,130, Cl. 317-235.

Casty, Richard: *See—*
Deflorin, Alberto; Abel, Heinz Reinach; Berger, Alfred; Casty, Richard; and Toepfl, Rosemarie,3,647,728.

Caterpillar Tractor Co.: *See—*
Allen, Thomas E., 3,646,957.

Cator, Edward J.; and Martin, William A., to Eastman Kodak Company. Intermittent film-feeding mechanism. 3,647,125, Cl. 226-62.

Caule, Elmer J.: *See—*
Ford, James A.; Saunders, Stuart R.; Caule, Elmer J.; and McLain, Charles D.,3,646,946.

Cavin, Lewis Fred: *See—*
Hilton, Joseph Lawrence; Graff, Charles Russell; and Cavin, Lewis Fred,3,646,766.

Cederstrand, Carl N.; and Dodson, Michael, to Beckman Instruments, Inc. Paramagnetic gas partial pressure measurer. 3,648,162, Cl. 324-36.

Celanese Coatings Company: *See—*
Schweri, Raphael Joseph, 3,647,567.

Celanese Corporation: *See—*
Gump, Klaus H.; and Stuetz, Dagobert E., 3,647,770.

Celfil Company Establishment: *See—*
Muller, Paul Adolf, 3,646,855.

Centre National d'Etudes Spatiales:*See—*
Manuali, Bertrand Claude Marcel Jean; Doullet, Robert; and Laedlein, Denis Jacques, 3,648,114.

Century Projector Corporation: *See—*
Chitty, Michael W., 3,647,157.

Ceramco, Inc.: *See—*
Brigham, Kristin; and Vickery, Ronald C., 3,647,488.

Cermak, Robert E., to SCM Corporation. Process for preparing condiment-containing fatty particulates. 3,647,480, Cl. 99-140.

Certain-Teed Products Corporation: *See—*
Tilbrook, Kenneth B., 3,647,382.

Cervenka, Joseph J.; and Hetzel, Marvin E. Clip. 3,646,654, Cl. 29-190.

Cesca, Sebastiano; Roggero, Arnaldo; and Marconi, Walter, to Snam Progetti S.p.A. Curable, amorphous, olefinic terpolymers. 3,647,767, Cl. 260-80.7

Chabardes, Pierre; and Colevray, Louis, to Rhone-Poulenc S.A. Ruthenium complexes and processes for their preparation. 3,647,832, Cl. 260-429.

Chafetz, Harry: *See—*
Mead, Theodore C.; and Chafetz, Harry,3,647,886.

Chamberlin, John H. Binding post construction. 3,647,306, Cl. 402-48.

Champion Spark Plug Company: *See—*
Gauthier, William D.; and Lierke, Ernst G., 3,647,143.

Chandler Evans, Inc.: *See—*
Hunter, John M., 3,646,952.

Chang, Richard S.; Cutler, Stanley; La Branche, Harvey W.; Pearlman, Marshall B.; Ryan, John W.; and Toy, Raymond M., to Mattel, Inc. Electronic organ wherein musical sounds and a tremolo effect are provided by electro-optical apparatus. 3,647,927, Cl. 84-1.18

Chang, Yun Ger, to Reichhold Chemicals, Inc. Certain peroxy-containing 2-oxo-tetrahydrofurans. 3,647,822, Cl. 260-343.6

Chapman, Adrian R.: *See—*
Edwards, John W.; Eason, John W., Jr.; Chapman, Adrian R.; and Clavel, Emerson M.,3,646,741.

Chapman, Charles C., to Phillips Petroleum Company. Isostripper with normal butane removal in an alkylation system. 3,647,905, Cl. 260-683.4

Chapman, Douglas W.; Overley, Richard Dean; Rands, Robert D., Jr.; and Schreiber, Ronald S. Method of making colored pigments having pearlescent qualities. 3,647,492, Cl. 106-291.

Chari, Nallan C. S.; Olson, Kermit E.; and Shick, Philip E., to Owens-Illinois, Inc. Recovery of sulfur values from flue gases with oxidized neutral sulfite green liquor. 3,647,363, Cl. 23-25.

Chase, Frank F.: *See—*
McCann, Gerald P.; and Chase, Frank F.,3,647,115.

Chase-Shawmut Company, The: *See—*
Kozacka, Frederick J., 3,648,210.

Chemetron Corporation: *See—*
Rathjen, Theodore Nicholas; and Hanson, Harold Biddick, 3,646,881.

Chemische Werke Albert, to Process for the preparation of etherified. melamine resins. 3,647,755, Cl. 260-67.6

Chenevert, Martin E. Treating subsurface water-sensitive shale formations. 3,646,997, Cl. 166-250.

Cheng, Chin Huan; and Leonard, Donald E., to Dow Chemical Company, The. Transfer device for cryogenic fluids. 3,648,018, Cl. 219-271.

Chepovesky, Mikhail Lvovich: *See—*
Beletsky, Naum Isosifovich; and Chepovesky, Mikhail Lvovich,3,646,788.

Cherubim, Martin Karl: *See—*
Wollner, Johannes; Cherubim, Martin Karl; and Henn, Friedrich Gerhard,3,647,918.

Chevron Research Company: *See—*
Brodbeck, John J., 3,647,898.
Egan, Clark J., 3,647,678.
Egan, Clark J., 3,647,681.
Stayner, Robert A.; and DeMay, George B., 3,648,013.
Straus, Alan E., 3,647,899.
Suzuki, Shigeto, 3,647,870.
Wilkes, John B., 3,647,842.
Wilkes, John B., 3,647,851.

Chilman, John Alfred: *See—*
Chilman, John Alfred; Brooking, Ivor Harold; Chilman, John Alfred; and Brooking, Ivor Harold,3,647,320.

Chilman, John Alfred; Brooking, Ivor Harold; Chilman, John Alfred; and Brooking, Ivor Harold, to Dowty Rotol Limited Dowty Rotol Limited. Bladed rotors Bladed rotors. 3,647,320, Cl. 416-157.

Chinoin Gyogyszer-es Vegyeszeti Termekek Tyara Rt.: *See—*
Harsanyi, Kalman; Reiter, Jozsef; Korbonits, Dezso; Gonczi, Csaba; Takacs, Kalman; Bako, Erzsebet; Leszkovszky, Gyorgy; Tardos, Laszlo; and Vertesy, Csaba, 3,647,809.

Chinuki, Takashi: *See—*
Ito, Ken; Kaminaka, Hiroshi; Kotera, Norio; Yamamoto, Shinji; Dohgane, Iwao; Shigehiro, Kosuke; Kuruma, Hiroshi; Chinuki, Takashi; Yoshitake, Hiroshi; Tanimoto, Kenji; Hasegawa, Shinichi; and Kobayasi, Nobuki,3,647,866.

Chisholm, Douglas S.: *See—*
Schrenk, Walter J.; Chisholm, Douglas S.; Cleereman, Kenneth J.; and Alfrey, Turner, Jr.,3,647,612.

Chitty, Michael W., to Century Projector Corporation. Motion picture projector excess rotational speed detector. 3,647,157, Cl. 242-191.

Christensen, Orland M., to Christensen, Sanborn & Matthews. Docking and hoisting device for cruiser dinghies. 3,647,089, Cl. 214-1.

Christensen, Sanborn & Matthews: *See—*
Christensen, Orland M., 3,647,089.

Christenson, Roger M.: *See—*
Dowbenko, Rostyslaw; and Christenson, Roger M.,3,647,737.

Christensson, Od Wikar, to Christenssons Maskiner & Patenter Aktiebolag. Package, preferably for dry and frozen material, and an arrangement for the production of such a package. 3,647,133, Cl. 229-37.

Christenssons Maskiner & Patenter Aktiebolag: *See—*
Christensson, Od Wikar, 3,647,133.

Christiansen, Paul J.; and Wallace, Robert F., to Mallory, P. R., & Co., Inc. Electrolytic capacitor having a seal including a hollow projecting terminal. 3,648,118, Cl. 317-230.

Christie, Joseph H.; and Humphrey, James R., to North American Rockwell Corporation. Solid state cell with a tellurium tetraiodide cathode. 3,647,549, Cl. 136-83.

Christoph, Walter P.; McQuitty, Jim B.; and Vendetti, Lewis A., to United States of America, Navy. Pressure detector. 3,646,814, Cl. 73-398.

Chromalloy American Corporation: *See—*
Milidantri, Thomas; and Brill-Edwards, Harry W., 3,647,517.

Chrysler Corporation: *See—*
Eshelman, Robert W., 3,646,925.
Leising, Maurice B.; Greif, Herman J., Jr.; Kirberg, James R.; and Willson, Philip J., 3,647,393.
Sarto, Jorma O., 3,646,923.

Church, Herman S., to Teledyne-Mid America Corporation. Butterfly valve construction. 3,647,180, Cl. 251-306.

Ciavarri, Peter Anthony: *See—*
Burt, Cortland Russell; and Ciavarri, Peter Anthony,3,647,455.

Ciba Corporation: *See—*
Carney, Richard William James, 3,647,802.

Ciba Limited: *See—*
Bruengger, Heinrich; and Boragine, Carlo, 3,647,466.
Deflorin, Alberto; Abel, Heinz Reinach; Berger, Alfred; Casty, Richard; and Toepfl, Rosemarie, 3,647,728.
Rohr, Otto; and von Orelli, Marcus, 3,647,888.

Ciba-Geigy AG: *See—*
Carr, Albert A.; Meyer, Donald R.; Carr, Albert A.; Meyer, Donald R.; and Klein, Georg Anton, 3,647,797.
Klein, Georg Anton, 3,647,798.

Cincinnati Milacron Inc.: *See—*
Abt, Ronald C., 3,647,671.
Vearil, Wayne L.; and Dever, Lewis A., 3,646,664.

C.I.T.-Compagnie Imdustrielle des Telecommunication: *See—*
Teurnier, Roger, 3,647,966.

Cities Service Oil Company: *See—*
Swanson, John W.; Hartman, David A.; Beers, Russel L.; and Jamieson, Ernest J., 3,647,694.

CKD Praha, oborovy podnik: *See—*
Kadera, Vaclav; Novotny, Josef; Vondruska, Miloslav; Feierfeil, Jiri; Svoboda, Vlastimil; Misarek, Dusan; Futera, Miroslav; Nacovska, Katerina; Janc, Zbynek; Nemec, Adolf; Penkava, Jiri; and Vitkovec, Zdenek, 3,647,312.

Claessens, Frans D.; and Hein, Theodore F., to N.V. Koninklijke Sphinx-Ceramique v/h Pegout. System for bringing into different positions a container containing an article and moving continuously along a given track, or parts of said container with respect to said article and one another, and for removing said article from the advancing container, more particularly for use in the manufacture of moulded ceramic articles. 3,647,345, Cl. 425-439.

Clapsaddle, George Sheri, Jr. Side flail mower. 3,646,733, Cl. 56-7.

Clark, Alfred J., to Motorola, Inc. AM-FM tuner having five pushbuttons with ten selections. 3,646,821, Cl. 74-10.33

Clark Equipment Company: *See—*
Snyder, James H., 3,646,890.

Clark, Jasper: *See—*
Cushman, Edward J.; and Clark, Jasper,3,647,971.

Clark, John Colin; Cowley, Brian Richard; Gregory, Gordon Ian; Kennedy, James; and Long, Alan Gibson, to Glaxo Laboratories Limited. Cephalosporins having a 3-thioether group. 3,647,788, Cl. 260-243.

Clark, Larry K., to Gulf & Western Industries, mesne. Load control error detector. 3,648,233, Cl. 340-46.

Clark, Thomas J.; and Brown, Howard W., to General Electric Company. Method of preparing curved pyrolytic graphite bodies having increased thickness to radius ratios. 3,647,511, Cl. 117-46.

Clark, William H.: *See—*
Schulz, Jay R.; and Clark, William H.,3,647,917.

Clauss, Harry G., Jr.: *See—*
Hance, Richard J.; Wiese, John R.; and Clauss, Harry G., Jr.,3,646,816.

Clavel, Emerson M.: *See—*
Edwards, John W.; Eason, John W., Jr.; Chapman, Adrian R.; and Clavel, Emerson M.,3,646,741.

Clay, Robert B., to Intermountain Research & Engineering Co., Inc. Method and apparatus for filling containers with explosive slurry. 3,646,844, Cl. 86-20.

Cleereman, Kenneth J., to Dow Chemical Company, The. Impact molded article. 3,647,614, Cl. 161-166.

Cleereman, Kenneth J.: *See—*
Schrenk, Walter J.; Chisholm, Douglas S.; Cleereman, Kenneth J.; and Alfrey, Turner, Jr.,3,647,612.

Cless, Gerhard, to Teletype Corporation. Friction clutch. 3,647,036, Cl. 192-26.

Cline, Charles W., to NL Industries, Inc. Titanium dioxide pigment having improved dispersibility in coating compositions. 3,647,495, Cl. 106-300.

Closs, Felix H., to International Business Machines Corporation. Multiplexer. 3,647,977, Cl. 179-15.

Closs, Felix H.; Seitzer, Dieter; and Stucki, Peter, to International Business Machines Corporation. Video multiplexing system. 3,647,949, Cl. 178-5.6

Clough, Philip J.; and Keough, Allen H., to King-Seeley Thermos Co., mesne. Machine-washable metallized fibrous article and method of making same. 3,646,749, Cl. 57-153.

Clough, Thomas J., to Sinclair Research, Inc. Condensation product of oil-soluble polymers with polyamine. 3,647,731, Cl. 260-23.7

Coach and Car Equipment Corporation: *See—*
Hultquist, Gordon W., 3,647,259.

Coffey, James P., to ESB Incorporated. Intercell connection for storage batteries. 3,647,553, Cl. 136-134.

Cogar Corporation: *See—*
Bryant, Richard W.; and Tu, George K., 3,648,079.

Cohn, Seymour B.: *See—*
Harrison, William H.; and Cohn, Seymour B.,3,648,200.

Cole, Edward N.: *See—*
Atkinson, Ward J.; and Cole, Edward N.,3,646,876.
Cole, Louis F., to Union Carbide Corporation. Liquid eutectic mixtures of ortho-tolylene-diamine, meta-tolylenediamine and bis (aminophenyl) methane. 3,647,702, Cl. 252-182.
Cole, William J.; and Rytina, Anton W., to Brunswick Corporation. Variable depth coating apparatus. 3,646,909, Cl. 118-629.
Coleman, Charles M. Reagent solution preparation. 3,647,397, Cl. 23-309.
Coleman, Lester E., to Lubrizol Corporation, The. Method for preparing alkoxypropionamides. 3,647,875, Cl. 260-561.
Colevray, Louis: *See—*
Chabardes, Pierre; and Colevray, Louis,3,647,832.
Collins, Joseph C., to Sterling Drug, Inc. Bis(3,3-dichloro-2-oxo-polymethyleneimines). 3,647,782, Cl. 260-239.3
Collins Radio Company: *See—*
Neal, Gordon L., 3,648,031.
Colman, Michael E.; and Stearns, Charles F., to United Aircraft Corporation. Engine compressor bleed control system. 3,646,753, Cl. 60-39.27
Colt, Ralph C.; and Seil, Kenneth F., to Eastman Kodak Company. Process for transferring dry developed electrographic images. 3,647,499, Cl. 117-17.5
Coltrinari, Enzo L.; and Kindig, James K., to Molybdenum Corporation of America. Two-stage countercurrent leaching process for the recovery of phosphates, yttrium and rare earth values. 3,647,361, Cl. 23-18.
Columbia Ribbon and Carbon Manufacturing Co., Inc.: *See—*
Newman, Douglas A., 3,647,502.
Comfax Communications Industries, Inc.: *See—*
Reader, Malcolm; Tregay, John L.; and Stern, Charles, 3,647,955.
Commodity Improvements Inc.: *See—*
Phillips, Walt, 3,647,700.
Commonwealth of Puerto Rico: *See—*
Cancel, Luis E.; Rivera-Ortiz, Jose Manuel; and Garcia-Rivera, Francisco, 3,647,062.
Compagnie des Compteurs: *See—*
Carnel, Alain, 3,648,182.
Compagnie Francaise de Raffinage: *See—*
Maurin, Jean, 3,647,903.
Compagnie Francaise Thomson Houston-Hotchkiss Brandt: *See—*
Cahen, Olivier; Picquendar, Jean-Edgar; and Pircher, Georges, 3,648,048.
Compagnie Generale D'Electricite:*See—*
Bechet, Louis; and Bertholon, Claude, 3,648,148.
Compagnie Internationale pour l'Informatique:*See—*
Blanchard, Joseph Louis, 3,647,400.
Conger, Channing C., to United States of America, National Aeronautics and Space Administration. Inductance device with vacuum insulation. 3,648,209, Cl. 336-220.
Conn, John B.: *See—*
Hinkley, David F.; and Conn, John B.,3,647,858.
Connell, Lehman J.: *See—*
Milton, Thomas J.; and Connell, Lehman J.,3,646,828.
Connett, Donald C.; Olsen, Gerald N.; and Lonnemo, Kurt R., to Sperry Rand Corporation. Power transmission. 3,646,959, Cl. 137-596.12
Conoby, Joseph F.: *See—*
Bellinger, Kenneth P.; and Conoby, Joseph F.,3,647,698.
Considine, William J.: *See—*
Reifenberg, Gerald H.; and Considine, William J.,3,647,833.
Consolidated Concrete Limited: *See—*
Johnson, Frederick S., 3,647,325.
Consolidated Electronics (Sales) Proprietary Limited: *See—*
Medding, Reuben; and Tyson, Graham Roland, 3,647,123.
Container Corporation of America: *See—*
La Grutta, Pascal A., 3,647,107.
Continental Can Company, Inc.: *See—*
Bozek, John S., 3,646,840.
Carnevalino, Ernest, 3,647,134.
Fiala, Edward J., 3,647,675.
Gor, Vishnu J.; and Manuel, Ernesto H., 3,647,520.
Contois, Lawrence Edward, to Eastman Kodak Company. Dinitroarylmethine dyes as sensitizers in electrophotographic layers. 3,647,433, Cl. 96-1.6
Contraves AG: *See—*
Parker, Bernard, 3,648,158.
Control Data Corporation: *See—*
Bloch, James E., 3,646,658.
Conversion Chemical Corporation: *See—*
Bellinger, Kenneth P.; and Conoby, Joseph F., 3,647,698.
Conveyor Specialties Company: *See—*
Kampfer, David H., 3,646,752.
Cook, Arnold G., to AVM Corporation. Method for tabulating election returns. 3,648,022, Cl. 235-61.9
Cook, Arnold M., to Norton Company. Spray nozzle orifice member. 3,647,147, Cl. 239-599.
Cook, James T.: *See—*
Lanning, Charles T.; and Cook, James T.,3,646,904.
Cook, Richard S.: *See—*
Bayer, Horst O.; Cook, Richard S.; and von Meyer, William C.,3,647,810.
Cooke, Geoffrey Cyril: *See—*
Beardmore, Alfred Cyril; Cooke, Geoffrey Cyril; and Stringer, Donald Charles,3,647,010.
Cooley, Michael P. Decorator garbage and trash container. 3,647,102, Cl. 220-17.
Cooper Industries, Inc.: *See—*
Reynolds, Harold C., 3,646,837.
Cooper, Robin D. G., to Lilly, Eli, and Company. Preparation of cephalosporin sulfoxides. 3,647,786, Cl. 260-243.
Cooper, Robin D. G., to Lilly, Eli, and Company. Process improvement for converting penicillin sulfoxide esters to cephem compounds. 3,647,787, Cl. 260-243.
Cording, Wesley Townsend, to ESB Incorporated. Tubular type positive plates. 3,647,546, Cl. 136-43.
Corley, Lawrence G.; and Johnson, David W., to Arrow-Hart, Inc. Infinite speed control switching device for use with electric motors in portable tools. 3,648,142, Cl. 318-345.
Corning Glass Works: *See—*
Szupillo, Raymond E., 3,647,566.
Corporacion de Fomento de la Produccion: *See—*
Goldberger, William M., 3,647,398.
Cosmopolitan Textile Company Limited: *See—*
Wildeman, Arno Edgar, 3,646,780.
Cotton, Curran D., to Maytag Company, The. Dryer control system. 3,647,196, Cl. 263-33.
Coupling Corporation of America: *See—*
Anderson, James H.; and Anderson, James H., Jr., 3,646,777.
Cowley, Brian Richard: *See—*
Clark, John Colin; Cowley, Brian Richard; Gregory, Gordon Ian; Kennedy, James; and Long, Alan Gibson,3,647,788.
Cowmeadow, Richard R., to Bunker-Ramo Corporation, The. Electrical connector having laminated contact element. 3,648,222, Cl. 339-14.
Cox, Ernest P. Windshield air deflector. 3,647,256, Cl. 296-91.
Cox, John M., to General Motors Corporation. Storage battery cover. 3,647,556, Cl. 136-170.
Crabtree, Kenneth L., to Keys Fibre Company. Egg carton with exterior windows. 3,647,132, Cl. 229-2.5
Crabtree, Royale R.: *See—*
Beeker, Charles W.; and Crabtree, Royale R.,3,647,170.
Crane Co.: *See—*
Fox, Leonard N., 3,647,328.
Crast, Leonard Bruce, Jr., to Bristol-Myers Company. Cephalosporanic acids. 3,647,789, Cl. 260-243.
Crawford, Clifford R.: *See—*
Abe, Fujio; and Crawford, Clifford R.,3,648,026.
Crawford, Douglas W.: *See—*
Elliott, James Kelly; and Crawford, Douglas W.,3,646,953.
Cripe, Maxwell L., to Bendix Corporation, The. Vacuum control for servomotor. 3,646,758, Cl. 60-54.6
Crist, Vernon W. Electric fence short detector. 3,648,266, Cl. 340-254.
Croix-Marie, Francis Marie Jean; and Grignon, Robert Georges, to Bertin & Cie. Confining system for ground effect machine. 3,647,018, Cl. 180-124.
Crookshank, Fred T., to Texaco Inc. Base coatings for launching lubricants. 3,647,693, Cl. 252-57.
Crosfield Electronics Limited: *See—*
Dobouney, Mouayed Edouard, 3,647,295.
Cross, Alexander D., to Syntex Corporation. Tetrahydropyranyl and tetrahydrofuranyl benzomorphan ethers. 3,647,806, Cl. 260-293.54
Cross, Edward A., to Texaco Inc. Corrosion-inhibiting compositions. 3,647,690, Cl. 252-33.3
Cross, Raymond E. Die casting machine. 3,646,990, Cl. 164-304.
Crowley, Donald P.: *See—*
Belason, E. Bruce; Castle, George K.; Crowley, Donald P.; and Morgida, Joseph V.,3,647,193.
Crown Zellerbach Corporation: *See—*
Back, Sangho E.; and Marti, Rueben A., 3,647,618.
Cumberland Packing Corporation: *See—*
Eisenstadt, Marvin E., 3,647,483.
Cunningham, James A.; Fuller, Clyde R.; and Wood, Samuel J., Jr., to Texas Instruments, Incorporated. Method of forming a composite insulating layer. 3,647,663, Cl. 204-192.
Curtice, Beverly A.; and Harnsberger, Bobby G., to Texaco Inc. Method and composition for stabilizing incompetent oil containing formations. 3,646,998, Cl. 166-276.
Curtis, Anthony John; Jaggers, Brian George; and Janes, John Francis, to Bush Boake Allen Limited. Isolongifoline esters. 3,647,847, Cl. 260-489.
Curtiss-Wright Corporation: *See—*
Davis, Charles S., 3,646,834.
Moskowitz, Seymour, 3,647,316.
Cushman, Edward J.; and Clark, Jasper, to Watch-Tel 24, Inc. Automatic reporting monitoring and control system. 3,647,971, Cl. 179-2.
Cushman, Kenneth V., to Delron Fastener Division of Rex Chainbelt Inc. Encapsulated floating and non-floating fasteners. 3,646,982, Cl. 151-41.7
Cutler, Stanley: *See—*
Chang, Richard S.; Cutler, Stanley; La Branche, Harvey W.; Pearlman, Marshall B.; Ryan, John W.; and Toy, Raymond M.,3,647,927.
Cutler-Hammer, Inc.: *See—*
Williams, Robert C., III, 3,648,004.
Cyba, Henryk A., to Universal Oil Products Company. Flame retarded composite. 3,647,609, Cl. 161-160.

Dahl, Einar S., to Outboard Marine Corporation. Safety lawn mower. 3,646,739, Cl. 56-320.1

Dahlgren, Harold P., to Dahlgren Manufacturing Company, Inc. Method and means for applying liquid to a moving web. 3,647,525, Cl. 117-111.

Dahlgren Manufacturing Company, Inc.: *See*—
Dahlgren, Harold P., 3,647,525.

Dahms, Harald; and Hunziker, Heinrich E., to International Business Machines Corporation. Electrostatic display panel. 3,648,281, Cl. 340-373.

Daikin Kogyo Co., Ltd.: *See*—
Ono, Hiroshi; and Higuchi, Toshikazu, 3,647,850.

Dainippon Pharmaceutical Co., Ltd.: *See*—
Shoji, Osamu; Hironaka, Jouji; and Kotani, Hirotada, 3,647,626.

Dalbinsh, Yan Yanovich: *See*—
Berzin, Gunard Valdemarovich; Kalnin, Arvid Yanovich; Sushkov, Alexandr Fedorovich; Skrupsky, Voldemar Petrovich; Ziemelis, Andris Eduardovich; Soloviev, Boris Fedorovich; Leeniex, Karl Mikhailovich; Sovetin, Vladimir Kirilovich; Gulbis, Yan Karlovich; Dalbinsh, Yan Yanovich; Priede, Bruno Andreevich; Upman, Karl Kristapovich; Muzhits, Vitold Iosifovich; Junga, Yan Petrovich; Krogzem, Ivar Arnoldovich; Greitan, Zigurd Boleslavovich; and Rotsen, Karl Arturovich,3,646,687.

Dame, Charles, Jr.; Stinson, William S., Jr.; and Capossela, Anthony C., to General Foods Corporation. Snack food product and process. 3,647,474, Cl. 99-83.

Daniel, Fred P., to ESB Incorporated. Water activated dry charged storage battery having buoyant internal tear strip plastic bag containing electrolyte producing substance. 3,647,555, Cl. 136-162.

Dannewitz, Robert E.; and Luongo, Albert M., to Technicon Instruments Corporation. Static mixer and method of making same. 3,647,187, Cl. 259-4.

Darcy, Charles B.: *See*—
Budris, Allan R.; McGowan, Frank J.; Evans, Lewis M.; Wayne, Theodore J.; Lithen, Eric E.; and Darcy, Charles B.,3,646,901.

Darsow, Gerhard, to Farbenfabriken Bayer Aktiengesellschaft. Polyarylether-sulphones. 3,647,751, Cl. 260-49.

Dato, Anthony L.: *See*—
Zilahy, Zoltan E.; and Dato, Anthony L.,3,646,656.

Dattilo, Donald J., to Motorola, Inc. Low friction guide for cartridge tape player. 3,647,225, Cl. 274-4.

Dauer, Charles W.: *See*—
Niccum, Forest G.; Kudlaty, Walter J.; Dauer, Charles W.; and Heinrich, Peter, Jr.,3,647,083.

Davies, Norman; and Binz, Robert D., to Westinghouse Electric Corporation. Switch having magnetic latching means. 3,648,204, Cl. 335-170.

Davies, Robert G.: *See*—
Ganong, William L., Jr.; Bryant, Furnie S.; Neill, Henry R.; and Davies, Robert G.,3,648,027.

Davis, Charles S., to Curtiss-Wright Corporation. Counter-rotating output transmission. 3,646,834, Cl. 74-674.

Davis, Edward J., to United States of America, Navy. Bomblet fuze system. 3,646,889, Cl. 102-70.

Davis, Frederick: *See*—
Sharpless, Edward N.; and Davis, Frederick,3,647,279.

Davis, George B., Jr. Solid fuel unit. 3,647,403, Cl. 44-6.

Davis, Walter J.: *See*—
Rostad, Nels C.; and Davis, Walter J.,3,647,315.

Davis, William H.; Hornung, Louis M.; Lindsey, Royce D.; and Tanner, Howard C., to International Business Machines Corporation. System for determining line measure. 3,647,041, Cl. 197-19.

Dawson, Peter S. S., to Canadian Patents and Development Limited. Apparatus for the continuous phased culturing of cells. 3,647,633, Cl. 195-139.

Dax, Peter R.; and Moore, Thomas M., to Westinghouse Electric Corporation. Two faced phased array. 3,648,284, Cl. 343-5.

Dayco Corporation: *See*—
Heiligenthal, Harry E.; and Nichols, Arthur E., Jr., 3,646,652.

Dean, Thomas Stanley. Recovering alkali metal salts from cement kiln gases by the steps of condensing leaching and crystallizing. 3,647,395, Cl. 23-299.

De Bres, Johannes Guiljelmus Cornelis Maria: *See*—
Wanmaker, Wille Lambertus; Vrugt, Johannes Wilhelmus Ter; and De Bres, Johannes Guiljelmus Cornelis Maria,3,647,708.

De Caro, Aristide R.; and Rainone, Nicholas J., to Westinghouse Electric Corporation. Lamp combination comprising an improved envelope for tungsten-halogen incandescible projection lamp. 3,648,094, Cl. 313-221.

Decker, Herbert: *See*—
Waldenburger, Hermann; and Decker, Herbert,3,647,040.

Dee, Colin W., to Aerostatic Limited. Fluid bearings. 3,647,272, Cl. 308-9.

Deering Milliken Research Corporation: *See*—
Klein, Norman E., 3,646,647.

Deflorin, Alberto; Abel, Heinz Reinach; Berger, Alfred; Casty, Richard; and Toepfl, Rosemarie, to Ciba Limited. Preparations of polyaddition products, processes for their manufacture and use. 3,647,728, Cl. 260-18.

Dega, Robert L., to General Motors Corporation. Precision molding apparatus. 3,647,337, Cl. 425-242.

De Gelder, Jacob: *See*—
Baginski, Albert R.; De Gelder, Jacob; and Marason, Gabriel, Jr.,3,646,703.

Degen, Ludwig: *See*—
Massarani, Elena; Nardi, Dante; and Degen, Ludwig,3,647,879.

De Groot, Johannes H.; Scheffer, Hendrik J.; and Smit, Willem H., to Shell Oil Company. Gas-liquid contacting tray. 3,647,192, Cl. 261-114.

DeHart, John Randle. Apparatus for feeding letter envelopes or the like. 3,647,203, Cl. 271-30.

De Hoff, Ronald L.: *See*—
Robinson, Robert E.; and De Hoff, Ronald L.,3,647,701.

De Lang, Hendrik, to U.S. Philips Corporation. Apparatus for determining the relative movement of an object with the use of an optical grating rigidly secured to the object. 3,648,055, Cl. 250-231.

DeLaval Turbine California, Inc.: *See*—
Burtis, Wilson A., 3,647,246.

De Leo, Richard V.; and Hagen, Floyd W., to Rosemount Engineering Company. Pressure sensor for determining fluid velocities. 3,646,811, Cl. 73-182.

Deline, Richard R.: *See*—
NcNeil, Donald J., Sr.; and Deline, Richard R.,3,646,975.

De Long, Charles, Jr.; and Newell, Stephen D., to Alco Standard Corporation. Tower irrigator. 3,647,139, Cl. 239-177.

DeLong, Robert J.; and Gerwitz, Paul F., to Spectrol Electronics Corporation. Potentiometer equipped with positive positioning means. 3,648,217, Cl. 338-143.

Delorme, John H., Jr. Reproduction apparatus using photovoltaic material. 3,647,286, Cl. 355-17.

Delron Fastener Division of Rex Chainbelt Inc.: *See*—
Cushman, Kenneth V., 3,646,982.

DEMAG Aktiengesellschaft: *See*—
Oppermann, Willi; Schonitz, Egon; and Wagner, Werner, 3,648,007.

Deman, Pierre; and Gouyet, Jean Pierre, to Thomson-CSF. Apparatus including sampling and quantizing means for discriminating received digital signals. 3,648,248, Cl. 340-172.5

DeMay, George B.: *See*—
Stayner, Robert A.; and DeMay, George B.,3,648,013.

DeMeyer, Dennis E.; and Allen, Frank D., deceased0 (by Allen, Mona Armstrong; executrix), to Eastman Kodak Company. Light sensitive halocarbon and phenol derivative composition. 3,647,448, Cl. 96-48.

Demme, Ernst; Schachowskoy, Theodor; Schuhmacher, Guenther; Fehlhaber, Juergen; and Hartmann, Ludwig, to Freudenberg, Carl, Kommanditgesellschaft. Process for producing artificial leather. 3,647,594, Cl. 156-306.

Dengo, Tadao: *See*—
Suenaga, Masanobu; Machii, Tetsuo; Sawano, Takahiro; Kobayashi, Takehiko; Dengo, Tadao; and Nakai, Tetsuzo,3,648,121.

Denis, Andre Maxime Philippe; and Ripart, Guy Marie, to Sud-Aviation Societe Nationale de Constructions Aeronautiques. Methods and apparatus for measuring magnetic fields by gyromagnetic resonance. 3,648,157, Cl. 324-0.5

Denison, Dean R.; and Morrison, Charles F., Jr., to Granville-Phillips Company. Quadrupole gas analyzer comprising four flat plate electrodes. 3,648,046, Cl. 250-41.9

Dennison Manufacturing Company: *See*—
Dudley, John S., 3,646,907.

Denny, Denny A., to Inca Metal Products Corporation. Structural element and structure. 3,647,080, Cl. 211-176.

Dentsply International Inc.: *See*—
Dougherty, Emery W., 3,647,498.

Deodhar, Anil N.: *See*—
Audeh, Azmi S.; Deodhar, Anil N.; and Glattfelder, Henry G.,3,648,134.

de Pava, Alberto Vajina: *See*—
de Varda, Giuseppe; and de Pava, Alberto Vajina,3,647,673.

Depoorter, Henri: *See*—
Hofman, Emiel Alexander; Ghys, Theofiel Hubert; and Depoorter, Henri,3,647,460.

DeRouw, Hubertus Johannes, to U.S. Philips Corporation. Method of manufacturing a glass article having a light-dispersing layer. 3,647,583, Cl. 156-6.

Derujinsky, Ruth; and Field, Patricia. Sun bather's rotatable platform. 3,646,896, Cl. 108-139.

Dessureault, Jean-Marie, to Carborundum Company, The. Core for silicon carbide furnace. 3,647,384, Cl. 23-208.

Detection Sciences, Inc.: *See*—
Purland, Donald A.; and Gustafson, Alan M., 3,646,751.

Detroit Edison Company, The: *See*—
Eicher, Dennis R., 3,648,070.

Deutsche Texaco Aktiengesellschaft: *See*—
Wollner, Johannes; Cherubim, Martin Karl; and Henn, Friedrich Gerhard, 3,647,918.

de Varda, Giuseppe; and de Pava, Alberto Vajina, 70% to Montecatini Edison S.p.A., and 30% to Giuseppe, de Varda. Stepped bottom for multicell furnace for production of aluminum by electrolysis. 3,647,673, Cl. 204-244.

Dever, Lewis A.: *See*—
Vearil, Wayne L.; and Dever, Lewis A.,3,646,664.

De Wittie, H W.; Kirchstein, John A.; and Atit, Kishore M., to International Salt Company. Production of high purity salt. 3,647,396, Cl. 23-299.

De Wolf, Frank T., to General Electric Company. Commutating flux fidelity improvement winding. 3,648,089, Cl. 310-186.

Dexter Corporation, The: *See—*
Malcolm, Earl W., 3,647,684.
Diamler-Benz Aktiengesellschaft: *See—*
Reisacher, Josef, 3,646,919.
Diamond Shamrock Corporation: *See—*
Bufton, Richard G.; Semancik, John R.; and King, George G., 3,647,769.
Horvath, Roland J.; and Parson, Charles G., 3,647,523.
Diassi, Patrick A.: *See—*
Levine, Seymour D.; and Diassi, Patrick A.,3,647,820.
Dick, A. B., Company: *See—*
Zahradnik, George J.; and Pudark, Arthur A., 3,647,288.
Dickinson, George A., to Pilkington Brothers Limited. Method and apparatus for manufacture of float glass. 3,647,408, Cl. 65-99.
Didas, Ronald E., to Stone Conveyor Co., Inc. Fast adjustment device for conveyor guide rails. 3,647,051, Cl. 198-204.
Diebold, James L.: *See—*
Wolf, Milton; and Diebold, James L.,3,647,800.
Diehl, James J.: *See—*
Pinner, Champ D.; Sligh, Cecil E.; Diehl, James J.; and Garland, Wade H., Jr.,3,648,163.
Diesel Kiki Kabushiki Kaisha: *See—*
Inoue, Takashi; and Abe, Yoshiaki, 3,646,916.
Dieterich, Donald B.; and Schrum, George L., to Akron Standard, a division of Eagle-Picher Industries, Inc. Tire fabric handling apparatus. 3,647,126, Cl. 226-105.
Diez, Gerhard: *See—*
Niedner, Peter; Diez, Gerhard; and Thubeauville, Heinz,3,647,357.
Digitronics Corporation: *See—*
Marino, Francis C., 3,648,195.
Di Leone, Roland Ralph, to American Cyanamid Company. Polyethylene as a lubricant for polyimides of 3,4- dicarboxy-1,2,3,4-tetrahydro-1-naphthalene succinic dianhydride and a diamine. 3,647,920, Cl. 260-851.
Dillard, Weldon B., 1/3 to Lubbock, Boyd Smith, and 1/3 to Smith, Landon. Pneumatic spinner for land vehicle tires. 3,646,824, Cl. 74-16.
Dingley, Wilfred; Bednar, John S.; and Rogers, Raymond R., to Canadian Patents and Development Limited. Plating high strength steel without hydrogen embrittlement. 3,647,648, Cl. 204-34.
Diran, Loris M.: *See—*
Pargeter, John K.; and Diran, Loris M.,3,647,419.
Dittmar, Bruce I., to Du Pont de Nemours, E. I., and Company. Rearrangement process for preparation of alkyl 2-benzimidazolecarbamates from alkyl 2-amino- benzimidazole-1-carboxylates. 3,647,817, Cl. 260-309.2
Dixit, Sudhakar G.: *See—*
Houghton, George E.; and Dixit, Sudhakar G.,3,646,846.
DMS Industries Limited: *See—*
Caroli, Italo, 3,646,801.
Dobouney, Mouayed Edouard, to Crosfield Electronics Limited. Colour printing apparatus. 3,647,295, Cl. 355-38.
Dobson, Ernest W.: *See—*
Kirk, Merritt C., Jr.; and Dobson, Ernest W.,3,647,679.
Dodds, Thomas J., Jr.; Eagleson, Clegg; and Gibson, Harold F., to Burroughs Corporation. Time-shared apparatus for operating plural display media, and display methods including paging, displaying special forms and displaying information in tabulated form. 3,648,245, Cl. 340-172.5
Dodson, Michael: *See—*
Cederstrand, Carl N.; and Dodson, Michael,3,648,162.
Doerge, Herman P.; and Wismer, Marco, to PPG Industries, Inc. Urethane foams with reduced smoke levels. 3,647,724, Cl. 260-2.5
Doessel, James H.; and McKenna, Patrick A. Plastic tennis racket having predetermined cross sections effecting flexibility. 3,647,211, Cl. 273-73.
Dohgane, Iwao: *See—*
Ito, Ken; Kaminaka, Hiroshi; Kotera, Norio; Yamamoto, Shinji; Dohgane, Iwao; Shigehiro, Kosuke; Kuruma, Hiroshi; Chinuki, Takashi; Yoshitake, Hiroshi; Tanimoto, Kenji; Hasegawa, Shinichi; and Kobayasi, Nobuki,3,647,866.
Dohner, Rene: *See—*
Simon, Wilhelm; Moller, Willi; and Dohner, Rene,3,647,666.
Dohrmann Instruments Company: *See—*
Stephens, Thomas M., 3,647,385.
Dolloff, Richard T.: *See—*
Mazdiyasni, Khodabakhsh S.; Dolloff, Richard T.; and Smith, Jonathan S., II,3,647,364.
Dombeck, Edward K., to Bendix Corporation, The. Surge brake control. 3,647,032, Cl. 188-112.
Dominion Engineering Works, Limited: *See—*
Truxa, Leslie, 3,647,620.
Donnelly, William Edward: *See—*
Purdy, Don Ryall; and Donnelly, William Edward,3,648,167.
Doppelt, Max J., deceased0 (by Pritzker, Jay A.; administrator), to Carey, E. A., Pipe Company. Cigarette and/or cigarette holder. 3,646,941, Cl. 131-9.
D'Ottavio, Eugene D.:*See—*
Grunwald, John J.; and D'Ottavio, Eugene D.,3,647,512.
Doty, Warren R.; and Knight, Bobbie D., to General Motors Corporation. Surface conditioner composition for ABS resin. 3,647,699, Cl. 252-79.2
Dougherty, Emery W., to Dentsply International Inc. Process for production of dental crowns. 3,647,498, Cl. 117-8.
Douglas, Peter L., to Brown International Corporation. Cloud fortified citrus fruit juices. 3,647,475, Cl. 99-105.
Doullet, Robert: *See—*
Manuali, Bertrand Claude Marcel Jean; Doullet, Robert; and Laedlein, Denis Jacques,3,648,114.
d'Ouville, Edmond L.:*See—*
Messman, Henry C., 3,647,416.
Dover Corporation: *See—*
Boudot, W. Donald; and Carl, Robert C., 3,647,182.
Jaseph, Lawrence Flower, 3,647,027.
Moore, Glenn E.; Wilson, Fred A.; and Wood, Chester W., 3,646,974.
Dow Chemical Company, The: *See—*
Cheng, Chin Huan; and Leonard, Donald E., 3,648,018.
Cleereman, Kenneth J., 3,647,614.
Jackson, Larry L., 3,647,894.
Lindblom, Robert O., 3,647,524.
Rieke, James K.; Behr, Douglas Raymond; and McIntire, Otis R., 3,647,617.
Schrenk, Walter J.; Chisholm, Douglas S.; Cleereman, Kenneth J.; and Alfrey, Turner, Jr., 3,647,612.
Stenger, Vernon A.; and Kramer, Walter R., 3,647,261.
Wolf, Paul A., 3,647,610.
Dow Corning Corporation: *See—*
Hartlein, Robert C.; and Olson, Carl R., 3,647,846.
Loree, Lorne A.; Pierce, Ogden R.; and Kim, Yung Ki, 3,647,740.
Schulz, Jay R.; and Clark, William H., 3,647,917.
Dowbenko, Rostyslaw; and Christenson, Roger M., to PPG Industries, Inc. Novel mixture of acrylic monomers and the preparation thereof. 3,647,737, Cl. 260-31.6
Dowty Rotol Limited: *See—*
Chilman, John Alfred; Brooking, Ivor Harold; Chilman, John Alfred; and Brooking, Ivor Harold, 3,647,320.
Chilman, John Alfred; Brooking, Ivor Harold; Chilman, John Alfred; and Brooking, Ivor Harold, 3,647,320.
Dowty Technical Developments Limited: *See—*
Boydell, Kenneth Raymond, 3,647,321.
Draber, Wilfried; Buchel, Karl Heinz; and Piempel, Manfred, to Farbenfabriken Bayer Aktiengesellschaft. N-Substituted imidazoles and their salts. 3,647,816, Cl. 260-309.
Draim, John E. Plug nozzle attitude control device. 3,647,161, Cl. 244-3.2
Drelicharz, Joseph A. Fluked core retainer. 3,647,009, Cl. 175-242.
Dresser Industries, Inc.: *See—*
Hulslander, William L., 3,647,181.
Drew, Gene R., to United States of America, Navy. Slug throwing deployment apparatus. 3,646,847, Cl. 89-1.
Drewry, Hugh S., to Allis-Chalmers Manufacturing Company. Apparatus for and method of controlling rotary kiln operation. 3,647,195, Cl. 263-33.
Driver, Wilber B., Company: *See—*
Majesko, George A., 3,647,424.
Drude, Edward H.; and Mangum, Bennie Franklin, to Scovill Manufacturing Company. Air gun having a safety nozzle. 3,647,142, Cl. 239-288.3
Drug Research, Inc.: *See—*
Paterson, Laurence O., 3,647,836.
Dryg, Charles J., to Iomec, Incorporated. Self-folding cable carrier. 3,647,936, Cl. 174-69.
Dubeck, Michael; and Brackenridge, David R., to Ethyl Corporation. Olefin dimerization. 3,647,883, Cl. 260-683.15
Dudash, James J.: *See—*
Rice, Hal H.; and Dudash, James J.,3,646,993.
Dudley, John S., to Dennison Manufacturing Company. Inking pad assembly. 3,646,907, Cl. 118-264.
Dues, Joseph J.: *See—*
Yost, Robert L., 3,647,308.
Duffy, Gregory A. Chemical milling process. 3,647,584, Cl. 156-11.
Duke, Keith A.: *See—*
Carter, William C.; Duke, Keith A.; and Jessep, Donald C., Jr.,3,648,239.
Dunlop Holdings Limited: *See—*
Searle, Eric H.; and Goud, Eric G., 3,648,164.
Du Pont de Nemours, E. I., and Company: *See—*
Barlow, David O., 3,647,528.
Boswell, George A., Jr., 3,647,830.
Buchanan, James B., 3,647,861.
Burt, Cortland Russell; and Ciavarri, Peter Anthony, 3,647,455.
Dittmar, Bruce I., 3,647,817.
Ehrich, Felix Frederick; and Marshall, William J., 3,647,494.
Ganci, James B.; and Mastrangelo, Sebastian V. R., 3,647,651.
Grubb, Eugene L., 3,647,467.
Josey, Alden Dwayne, 3,647,856.
Kegelman, Matthew Roland, 3,647,557.
McDonald, John William, 3,647,733.
Meadows, Geoffrey W., 3,647,401.
Morrison, James S., 3,647,688.
Rushmere, John Derek, 3,647,388.
Sarafidis, Christos, 3,647,901.
Strohmaier, Alfred J., 3,646,747.
Williams, Meurig W., 3,647,355.

Du Pont of Canada Limited: *See—*
Pope, Kenneth W., 3,646,715.

Du Rocher, Gideon A., to Essex International, Inc. Current control apparatus and methods of manufacture. 3,648,002, Cl. 200-166.

Du Ross, James W.; and Lensack, Gabriel P., to Atlas Chemical Industries, Inc. Surfactant composition for frozen confections. 3,647,477, Cl. 99-136.

Dyer, Lawrence D., to Texas Instruments, Incorporated. Production of semiconductor material. 3,647,530, Cl. 117-201.

Dyer, Lawrence D., to Texas Instruments, Incorporated. Production of single crystal semiconductor material. 3,647,561, Cl. 148-1.6

Dynamit Nobel AG: *See—*
Buning, Robert; Bernhardt, Gunther; Bierwirth, Egon; and Trautvetter, Werner, 3,647,402.
Hillers, Theo, 3,647,607.

Dzierzanowski, Frank J.: *See—*
Haden, Walter L., Jr.; and Dzierzanowski, Frank J.,3,647,718.

Eagle-Picher Industries, Inc.: *See—*
Dieterich, Donald B.; and Schrum, George L., 3,647,126.

Eagleson, Clegg: *See—*
Dodds, Thomas J., Jr.; Eagleson, Clegg; and Gibson, Harold F.,3,648,245.

Eason, John W., Jr.: *See—*
Edwards, John W.; Eason, John W., Jr.; Chapman, Adrian R.; and Clavel, Emerson M.,3,646,741.

Eastman Kodak Company: *See—*
Alsup, Michael J.; and Guevara, Alfredo R., 3,647,446.
Bass, Jon Dolf, 3,647,439.
Borden, Douglas G.; Unruh, Cornelius C.; and Merrill, Stewart H., 3,647,444.
Bush, Walter M., 3,647,436.
Cator, Edward J.; and Martin, William A., 3,647,125.
Colt, Ralph C.; and Seil, Kenneth F., 3,647,499.
Contois, Lawrence Edward, 3,647,433.
DeMeyer, Dennis E.; and Allen, Frank D., 3,647,448.
Gardner, Ray E., 3,647,599.
Gilson, Richard E.; and Rauner, Frederick J., 3,647,447.
Goldman, Martin; and Johnson, Arthur L., 3,647,429.
Haist, Grant M.; King, James R.; and Pupo, David A., 3,647,453.
Hendess, Raymond W.; and Gilmour, Hugh S. A., 3,647,452.
Hochreiter, William T., 3,646,864.
Hunter, Clarence S., 3,647,454.
Mack, Richard C.; Lejnieks, George; and Morrison, Edward D., 3,647,619.
Malloy, Richard J.; and Malloy, Richard J., 3,647,449.
Malloy, Richard J.; and Malloy, Richard J., 3,647,449.
McCall, Marvin A., 3,647,750.
Olson, James R., 3,647,696.
Prevot, Rene, 3,647,541.
Rasch, Arthur A., 3,647,440.
Rauner, Frederick J.; Arcesi, Joseph A.; and Guild, John R., 3,647,443.
Rosenburgh, Norman J., 3,647,064.
Rossi, Louis J., 3,647,431.
Smith, Donald A.; and Verdone, Joseph A., 3,647,464.
Surash, John J.; Giorgianni, Edward J.; and Hotter, Lynn R., 3,647,461.
Surash, John J.; Giorgianni, Edward J.; and Hotter, Lynn R., 3,647,462.
Taber, Robert C.; and Russell, William H., 3,647,459.
Taber, Robert C.; and Koller, James E., 3,647,463.
Tucker, William M.; Gardner, Barrie; and Hayford, John W., 3,647,646.

Ebihara, Akio: *See—*
Mizutani, Takashi; Anzai, Masao; and Ebihara, Akio,3,647,503.

Eck, Herbert; Schwarzbauer, Hans; and Spes, Hellmuth, to Wacker-Chemie G.m.b.H. Process for producing acetylchloride. 3,647,871, Cl. 260-544.

Edinger, Calvin R. Transport attachment for grain augers. 3,647,052, Cl. 198-233.

Edwards, John W.; Eason, John W., Jr.; Chapman, Adrian R.; and Clavel, Emerson M. Fruit harvesting apparatus. 3,646,741, Cl. 56-328.

Edwards, Kenneth N. Air-dried polyester coating and application. 3,647,516, Cl. 117-64.

Edwin, Wohrstein, to Feinwerkbau Westinger & Altenburger KG. Interchangeable front sight for hand firearms. 3,646,682, Cl. 33-47.

Egan, Clark J., to Chevron Research Company. Process for producing high yields of low freeze point jet fuel. 3,647,678, Cl. 208-59.

Egan, Clark J., to Chevron Research Company. Catalytic dewaxing. 3,647,681, Cl. 208-111.

Eggert, Walter S., Jr.; and Frankel, Michael S., to Budd Company, The. Ejection seat arrangement. 3,647,168, Cl. 244-122.

Egnaczak, Raymond K., to Xerox Corporation. Materials application and cleaning apparatus for xerographic apparatus. 3,647,294, Cl. 355-15.

Egnaczak, Raymond K.; and Squassoni, Gino F., to Xerox Corporation. Photoelectrophoretic imaging system. 3,647,290, Cl. 355-3.

Eguchi, Naoki: *See—*
Okamoto, Kazuo; Eguchi, Naoki; Sakao, Nasuo; Honda, Ichiro; and Suzuki, Eizo,3,647,571.

Eguchi, Sadanari: *See—*
Shimazaki, Hideo; Tsukamoto, Shuji; Saito, Tadaomi; Eguchi, Sadanari; and Komata, Yasushi,3,647,825.

Ehrich, Felix Frederick; and Marshall, William J., to Du Pont de Nemours, E. I., and Company. Process for making solid solutions of quinacridone and derivatives thereof. 3,647,494, Cl. 106-288.

Ehrlich, Don E., to TRW Inc., mesne. Stud feeding system for welding tools. 3,647,129, Cl. 227-112.

Eicher, Dennis R., to Detroit Edison Company, The. Structure for and method of voltage dip counting. 3,648,070, Cl. 307-235.

Eifler, Willi: *See—*
Raue, Roderich; Eifler, Willi; and Kuhlthau, Hans-Peter,3,647,349.

Eisenstadt, Marvin E., to Cumberland Packing Corporation. Cyclamate-free calorie-free sweetener. 3,647,483, Cl. 99-141.

Elecompack Company Limited: *See—*
Naito, Han-Ichiro; and Yamaguchi, Tsuneo, 3,648,241.

Electronic Communications, Inc.: *See—*
Myers, Lester W., 3,646,804.

Electronic Industrial Engineering, Inc.: *See—*
Thompson, John R., 3,648,000.

Electroprint, Inc.: *See—*
Pressman, Gerald L.; and Kittredge, Thomas D., 3,647,291.

Eleusis Bauxite Mines Mining Industrial & Shipping Inc.: *See—*
Svoronos, Jason, 3,647,372.

Elie, De Roberval: *See—*
Tanguay, Jean-Paul; and Elie, De Roberval,3,647,046.

Elings, Virgil B.; and Landry, Caliste J. Optical display device. 3,647,284, Cl. 350-294.

Elka Trust Reg.: *See—*
Roben, Lucas Wilhelmus, 3,646,641.

Elliott, David G.: *See—*
United States of America,National Aeronautics and Space Administration, Administrator, 3,648,083.

Elliott, Henry H., to United States of America, Navy. Time recovery system from a pulse modulated radio wave. 3,648,173, Cl. 325-58.

Elliott, James Kelly; and Crawford, Douglas W., to Macco Oil Tool Co., Inc. Gas lift apparatus. 3,646,953, Cl. 137-155.

Elliott, Michael, to National Research Development Corporation. Substituted furoic acids and esters thereof. 3,647,824, Cl. 260-347.5

Ellis, David H., to Rixson Inc. Closure operator. 3,646,877, Cl. 98-110.

Ellis, Leonard C.: *See—*
Kise, Mearl A.; and Ellis, Leonard C.,3,647,876.

Ellsworth, Orval T. Manipulable amusement device. 3,646,704, Cl. 46-90.

Elms, Robert T.: *See—*
Engel, Joseph C.; and Elms, Robert T.,3,648,106.

Elslager, Edward F., to Parke, Davis & Company. Cyclicamino alkylaminothioacridines. 3,647,796, Cl. 260-279.

Embree, Milton L.; and Huber, William R., III, to Bell Telephone Laboratories Incorporated. Measurement of field effect transistor pinch-off voltage. 3,648,170, Cl. 324-158.

Emery, A. H., Company, The: *See—*
Bradley, Chester D.; and Tate, Malcolm C., 3,646,854.

Emmel, Henry J.; and Morgan, Thomas J., to Bausch & Lomb Incorporated. Micro-volume flow cell. 3,647,304, Cl. 356-246.

Energy Conversion Devices, Inc.: *See—*
Fleming, Gordon R.; and Ovshinsky, Stanford R., 3,647,664.

Engel, Alexander: *See—*
United States of America,National Aeronautics and Space Administration, Administrator, 3,648,250.

Engel, Joseph C.; and Elms, Robert T., to Westinghouse Electric Corporation. Dynamic reactorless high frequency vapor lamp ballast. 3,648,106, Cl. 315-291.

Engelbart, Fritz, to Orenstein-Koppel und Lubecker Maschinenbau A.G. Device for purifying polluted water. 3,647,081, Cl. 210-150.

Engelhard Minerals & Chemicals Corporation: *See—*
Haden, Walter L., Jr.; and Dzierzanowski, Frank J., 3,647,718.

Engelmann, Karl. Adjustable shawl collar. 3,646,614, Cl. 2-91.

Englesmann, Dieter: *See—*
Von Sybel, Reinhard; Englesmann, Dieter; and Fauth, Gunter,3,646,862.

English Electric Company Limited, The: *See—*
McMillan, Peter William; and Partridge, Graham, 3,647,489.

Enloe, Louis H., to Bell Telephone Laboratories, Incorporated. Single tube color TV camera using 120 degree phase separation. 3,647,946, Cl. 178-5.4

Enlow, Dale S.; and Varner, Lawrence C., Jr., to General Tire & Rubber Company, The. Cut-resistant foam article. 3,647,608, Cl. 161-95.

Environment/One Corporation: *See—*
Naydan, Theodore T., 3,647,137.
Skala, George Frank, 3,647,300.

Erickson, Lloyd A., to Illinois Tool Works Inc. Method of making blue lateral and purity magnets. 3,646,669, Cl. 29-607.

Ermolova, Tatyana Ivanovna: *See—*
Komarov, Nikolai Vasilievich; and Ermolova, Tatyana Ivanovna,3,647,844.

Ernick, Frederick G.; New, Thorndike C. T.; and Walczak, Donald A. Epitaxial base high speed PNP power transistor. 3,648,123, Cl. 317-235.

Ernsberger, Glenn W.: *See—*
Kernick, Andress; Geyer, Manvel A.; and Ernsberger, Glenn W.,3,648,150.

Ernst, Robert, to Textilana Corporation. N-(2-Hydroxyalkyl)sarcosine-N-oxides. 3,647,868, Cl. 260-534.

ESB Incorporated: *See—*
Bergum, Bernard C.; and Svardal, Per S., 3,647,586.

Coffey, James P., 3,647,553.
Cording, Wesley Townsend, 3,647,546.
Daniel, Fred P., 3,647,555.
Nervik, Torbjorn, 3,647,547.

Esco Corporation: *See—*
NcNeil, Donald J., Sr.; and Deline, Richard R., 3,646,975.

Esemplare, Pascal E.; and West, Charles P., 1/2 to Vi-Vox, Incorporated, and 1/2 to Frankel Company, Incorporated. Cold-formable decorative laminate and method of making same. 3,647,603, Cl. 161-5.

Eshelman, Robert W., to Chrysler Corporation. Crankcase ventilation. 3,646,925, Cl. 123-119.

Eskimo Pie Corporation: *See—*
Minor, Ronald E.; and McMillion, Sidney B., 3,647,478.

Essex International, Inc.: *See—*
Du Rocher, Gideon A., 3,648,002.
Sognefest, Peter W.; and Estes, Bay E., III, 3,648,057.

Esso Research and Engineering Company: *See—*
Langer, Arthur W., Jr., 3,647,912.

Estes, Bay E., III: *See—*
Sognefest, Peter W.; and Estes, Bay E., III,3,648,057.

Ethyl Corporation: *See—*
Ashby, Eugene C.; and Kobetz, Paul, 3,647,399.
Bryce-Smith, Derek; and Adcock, Stuart Samuel, 3,647,715.
Dubeck, Michael; and Brackenridge, David R., 3,647,883.
Hudson, Russell L.; Williams, Kenneth C.; and Smith, Martin B., 3,647,777.
Marsee, Frederick J., 3,646,921.
Williams, Kenneth C., 3,647,837.
Williams, Kenneth C.; and Thomas, Wilford H., 3,647,838.
Zaweski, Edward F.; and Meltsner, Bernard R., 3,647,749.

Eto, Yoshizumi; and Hibi, Masao, to Hitachi, Ltd. Chrominance signal generator having a patterned filter. 3,647,947, Cl. 178-5.4

Eto, Yoshizumi; and Hibi, Masao, to Hitachi, Ltd. Chrominance signal generator having striped filter. 3,647,948, Cl. 178-5.4

Etronic Corporation: *See—*
Goodenough, Walter E., 3,646,685.

Eugene-Gallia, Societe Anonyme: *See—*
Galerne, Jean, 3,647,350.

Eul, Edward A., Jr.; and Richter, Ronald B., to Ampex Corporation. Demagnetizer/cleaner. 3,647,990, Cl. 179-100.2

Evalds, Egils. Circuit for controlling a heat generating device. 3,648,077, Cl. 307-252.

Evans, Lewis M.: *See—*
Budris, Allan R.; McGowan, Frank J.; Evans, Lewis M.; Wayne, Theodore J.; Lithen, Eric E.; and Darcy, Charles B.,3,646,901.

Evenson, Merle A., to Wisconsin Alumni Research Foundation. Treatment of blood with oleaginous substance. 3,647,624, Cl. 195-1.8

Evers, William J.; Katz, Ira; Wilson, Richard A.; and Theimer, Ernst T., to International Flavors & Fragrances Inc. Heterocyclic pyrazines. 3,647,792, Cl. 260-250.

Ewell, David G., to Kontur Kontact Lens Company, Inc. Hydrophilic contact lens material. 3,647,736, Cl. 260-29.6

Explosive Technology, Inc.: *See—*
Posson, Philip Lynn; Moore, Donald Baker; and Nicholson, Dallas Earl, 3,646,888.

Fabiano, Lucian Philip, Jr.; Grandmaison, John Paul; Greason, William Wallace, III; and King, Ted R., Jr., to Bell Telephone Laboratories, Incorporated. Switching network control without network map. 3,647,980, Cl. 179-18.

Factory Mutual Research Corporation: *See—*
Livingston, William L., 3,647,001.

Fairbairn, Thomas E. Radio frequency generated electron beam torch. 3,648,015, Cl. 219-121.

Fairchild Camera and Instrument Corporation: *See—*
Lenzlinger, Martin, 3,648,127.
Smith, William R.; Rice, Rex; and Mazor, Stanley, 3,647,348.
Weckler, Gene P., 3,648,051.

Fairchild Camera and Instruments Corporation: *See—*
Peltzer, Douglas L., 3,648,125.

Falk, George L.; and Jones, Daniel F., to Trane Company, The. Mobile refrigeration system. 3,646,773, Cl. 62-160.

Fallwell, William F., Jr., to Monsanto Company. Ethylene/vinyl chloride/N-methylol acrylamide. 3,647,615, Cl. 161-170.

Farbenfabriken Bayer Aktiengesellschaft: *See—*
Bossert, Friedrich; and Vater, Wulf, 3,647,807.
Darsow, Gerhard, 3,647,751.
Draber, Wilfried; Buchel, Karl Heinz; and Plempel, Manfred, 3,647,816.
Marquarding, Dieter; Ugi, Ivar V.; Kleimann, Helmut; and Hoffmann, Peter, 3,647,775.
Raue, Roderich; Eifler, Willi; and Kuhlthau, Hans-Peter, 3,647,349.
Wagner, Kuno; and Mennicken, Gerhard, 3,647,848.

Farbwerke Hoechst Aktiengesellschaft: *See—*
Leugering, Hans-Joachim; and Schaum, Helmut, 3,647,922.

Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius Bruning: *See—*
Meininger, Fritz; and Hahnle, Reinhard, 3,647,813.

Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning: *See—*
Roscher, Gunter; and Schmitz, Heinz, 3,647,882.
Spietschka, Ernst; and Ische, Friedrich, 3,647,828.

Farian, Gerhard: *See—*
Saupe, Martin; and Farian, Gerhard,3,646,677.

Farley, David L.: *See—*
Manes, Dewey K.; Farley, David L.; and Wray, Gary Q.,3,646,995.

Farley, Francis F., to Shell Oil Company. Alpha-olefin production. 3,647,906, Cl. 260-683.

Farmer, Alonzo; and Bogdan, John R., to PPG Industries, Inc. Method for producing titanium dioxide. 3,647,383, Cl. 23-202.

Farmer, R. L., Limited: *See—*
Farmer, Robert Leslie Edward, 3,647,004.

Farmer, Robert Leslie Edward, to Farmer, R. L., Limited. Vertically and laterally adjustable plow standard. 3,647,004, Cl. 172-152.

Farquhar, Melville T., to Reynolds Metals Company. Carton and blank for making same. 3,647,058, Cl. 206-56.

Farrell, Robert G.: *See—*
Binkley, Carl R.; and Farrell, Robert G.,3,646,968.

Fastener Engineers, Inc.: *See—*
Alcock, Richard A., 3,646,798.

Faure, Louis H.; and Hardart, Alfred T., to International Business Machines Corporation. Consumable fixture for use in assembling a magnetic tape head. 3,647,334, Cl. 425-110.

Fauth, Gunter: *See—*
Von Sybel, Reinhard; Englesmann, Dieter; and Fauth, Gunter,3,646,862.

Fay, James M.: *See—*
Hale, Gordon H.; and Fay, James M.,3,647,255.

Feagan, Robert L. Apparatus and method for conveying information. 3,646,690, Cl. 35-16.

Feder, Alvin, to Motorola, Inc. Paper roll support and tension device. 3,647,158, Cl. 242-55.2

Feder, Alvin, to Motorola, Inc. Printer drive with page record feed. 3,647,356, Cl. 346-101.000

Fehlhaber, Juergen: *See—*
Demme, Ernst; Schachowskoy, Theodor; Schuhmacher, Guenther; Fehlhaber, Juergen; and Hartmann, Ludwig,3,647,594.

Feierfeil, Jiri: *See—*
Kadera, Vaclav; Novotny, Josef; Vondruska, Miloslav; Feierfeil, Jiri; Svoboda, Vlastimil; Misarek, Dusan; Futera, Miroslav; Nacovska, Katerina; Janc, Zbynek; Nemec, Adolf; Penkava, Jiri; and Vitkovec, Zdenek,3,647,312.

Feinwerkbau Westinger & Altenburger KG: *See—*
Edwin, Wohrstein, 3,646,682.

Felden, Alois Peter, to Stahlgruber, Otto Gruber, & Company. Method of manufacturing rubber wear cover for rollers and method of applying same. 3,647,589, Cl. 156-165.

Fenyes, Joseph G. E. 1-(Polyhaloalkylthio) indazoles. 3,647,818, Cl. 260-310.

Fernandez-Moran Villalobos, Humberto. Apparatus using ultra sharp diamond edge for ultra thin sectioning. 3,646,841, Cl. 83-171.

Ferranti, Limited: *See—*
Shepherd, Alexander Turnbull,; Smith, Laurence Philip; and Taylor, Lockhart, 3,648,030.

Ferrari, Harry M.: *See—*
Hepps, Michael B. L.; and Ferrari, Harry M.,3,647,623.

Ferris, Ray L.; and Spence, John H., to Pullman Incorporated. Kingpin lock and indicator for fifth wheel plate. 3,647,248, Cl. 287-20.5

Ferrofluidics Corporation: *See—*
Rosenweig, Ronald E.; and Resnick, Joseph, 3,648,269.

Ferroxcube Corporation: *See—*
Fisher, Robert D.; and Jones, Ernest W., 3,648,259.
Hagen, Thomas E., 3,648,060.

Fiala, Edward J., to Continental Can Company, Inc. Automatic rotary electrodeposition apparatus. 3,647,675, Cl. 204-300.

Fiedler, Alfred; and Pepperhoff, Werner, to Mannesmann Aktiengesellschaft. Method for reducing lossiness of sheet metal. 3,647,575, Cl. 148-111.

Field, Patricia: *See—*
Derujinsky, Ruth; and Field, Patricia,3,646,896.

Fielding, John O.: *See—*
Ben Daniel, David J.; Morgan, John R.; and Fielding, John O.,3,647,223.

Fincher, Curtis L.: *See—*
Birnbaum, Milton; and Fincher, Curtis L.,3,648,192.

Fine, Samuel: *See—*
Whetstone, Albert L.; and Fine, Samuel,3,648,277.

Fiore, Anthony N.; and McCarron, John D., to Spacetac Incorporated. Pulse generating circuit for producing pulses of amplitude which is a multiple of the amplitude of the source voltage. 3,648,181, Cl. 328-59.

Fioretti, Warren H.: *See—*
Jacoby, Ian H.; Giordano, Anthony J.; and Fioretti, Warren H.,3,648,240.

Fire Control Engineering Company: *See—*
Lindsay, Charles H., 3,647,002.

Firestone Tire & Rubber Company, The: *See—*
Kay, Edward Leo; Hunt, Jerry Donald; and Spitz, Robert Paul, 3,647,739.
Webb, Frederick J.; and Tate, David P., 3,647,774.

Fischer, Rainer: *See—*
Fischer, Stefan; and Fischer, Rainer,3,647,341.

Fischer, Stefan; and Fischer, Rainer. Mold synchronizing apparatus. 3,647,341, Cl. 425-326.

Fisher, George M. C., to Bell Telephone Laboratories, Incorporated. Method of achieving surface refractive index changes in a glass light guide element. 3,647,406, Cl. 65-30.

Fisher, Leslie George, to G.K.N. Birfield Transmissions Limited. Sealed type universal joint. 3,646,778, Cl. 64-32.

Fisher, Robert D.; and Jones, Ernest W., to Ferroxcube Corporation. Plated wire memory. 3,648,259, Cl. 340-174.

Fitzpatrick, Hugh M.; Neville, James J.; Thompson, John; and Boggs, Fitzhugh W., deceased0 (by Boggs, Elizabeth M.; executrix), to United States of America, Navy, mesne. Vibration isolation module for towed cables. 3,648,226, Cl. 340-5.

Fitzpatrick, James, to Wilkinson Sword Limited. Holders for shaving devices. 3,646,674, Cl. 30-64.

Fitzsimons, Alan R.; and Phelps, Robert J., to San/Bar Electronics Corporation. Key system line card circuit. 3,647,983, Cl. 179-99.

Fitzsimons, William D.; and Radin, Bernard G., to Ford Motor Company. Vehicle speed responsive system. 3,647,016, Cl. 180-105.

Fives Lille-Cail: *See—*
Mercier, Andre, 3,647,135.

Flanagan, Gillis P. Method and system for simplifying speech waveforms. 3,647,970, Cl. 179-1.5

Fleming, Gordon R.; and Ovshinsky, Stanford R., to Energy Conversion Devices, Inc.Method of making a current controlling device including a VO_2 film. 3,647,664, Cl. 204-192.

Fleming, Robert W.: *See—*
Sill, Arthur D.; and Fleming, Robert W.,3,647,860.

Flohr, William P., Jr.; and Boller, John A., to Landis Tool Company, mesne. Safety device for precision rotary location of crank fixtures in a machine tool. 3,646,710, Cl. 51-105.

Florjancic, Peter. Closure apparatus. 3,646,853, Cl. 92-76.

Fluor Products Company, Inc.: *See—*
Furlong, Donn B.; Luzaich, Samuel; and Forchini, James F., 3,647,317.

Flur, Barry L.: *See—*
Alberts, Gene S.; and Flur, Barry L.,3,647,643.

FMC Corporation: *See—*
Pfaffenberger, Eugene E., 3,647,273.
Stange, Hugo, 3,647,710.

Foley, Charles F.; McCarthy, Charles D.; and Rabens, Neil W. Pan puzzles. 3,647,218, Cl. 273-157.

Foliage Co. of America: *See—*
Schoenherr, Leonard W.; Schoenherr, Robert O.; and Schmock, John W., 3,647,604.

Fong, Leong Q.: *See—*
Hurd, Stanley E.; and Fong, Leong Q.,3,647,266.

Forchini, James F.: *See—*
Furlong, Donn B.; Luzaich, Samuel; and Forchini, James F.,3,647,317.

Ford, James A.; Saunders, Stuart R.; Caule, Elmer J.; and McLain, Charles D., to Olin Mathieson Chemical Corporation. Copper alloy cleaning process. 3,646,946, Cl. 134-3.

Ford Motor Company: *See—*
Bozoian, Michael, 3,648,062.
Cassidy, Donald J., 3,647,228.
Fitzsimons, William D.; and Radin, Bernard G., 3,647,016.
Hansen, Gunnar W., 3,646,731.
Harvey, James E.; Irland, Max J.; and Lindberg, Victor L., 3,647,285.
Holloway, Henry, 3,647,197.
Janosi, Francis L., 3,646,831.
Reno, Frederick, 3,646,829.
Rich, James L.; and Weintraub, Marvin H., 3,647,744.
Schrock, Larry R., 3,646,830.
Vartanian, Richard D., 3,646,920.
Watts, Wilson J., 3,646,644.

Fordyce, Homer E., to Marley Company, The. Splash bar for cooling tower fill assembly. 3,647,191, Cl. 261-111.

Forschungsgemeinschaft fur technisches Glas e.V.: *See—*
Greil, Erich, 3,647,506.

Forschungsintitut fur Textillechnologie Karl-Marx- Stadt: *See—*
Scholtis, Walter; Ploch, Siegfried; Schattauer, Friedrich; Schonfuss, Martin; and Heilmann, Horst, 3,646,781.

Forster, Friedrich M. O. Nondestructive testing system. 3,646,789, Cl. 72-10.

Fortunato, Vincent, to Henschel-Steinau Co. Shelf extender. 3,647,078, Cl. 211-134.

Foster, Daniel S., to Gale, W. D., Inc. Air compression equipment for therapeutic use. 3,646,934, Cl. 128-212.

Foster, George N., to Union Carbide Corporation. Olefin polymer compositions. 3,647,738, Cl. 260-32.6

Foster, Jack D.; and Osterink, Larry M., to Sylvania Electric Products, Inc. Mode locked frequency doubled laser. 3,648,193, Cl. 331-94.5

Foster, Richard N. Process for producing propylene. 3,647,657, Cl. 204-168.

Foster, Roy Vivian: *See—*
Bays, David Edmund; and Foster, Roy Vivian,3,647,881.

Foster Wheeler Corporation: *See—*
Berman, Irwin, 3,647,103.

Foulkes, John D.; and Bender, Warren G., to Wescom, Inc., mesne. Tone disabler. 3,647,993, Cl. 179-170.2

Fouquet-Werk, Frauz & Planck: *See—*
Nuber, Otto; and Norz, Richard, 3,646,779.

Fox, Leonard N., to Crane Co., d/b/a Hydro-Aire Division. Slipper vane and valve combination for vane type fluid pump. 3,647,328, Cl. 418-136.

Fragas, Restituto R. Mattress structure or the like. 3,646,621, Cl. 5-66.

Frankel Company, Incorporated: *See—*
Esemplare, Pascal E.; and West, Charles P., 3,647,603.

Frankel, Michael S.: *See—*
Eggert, Walter S., Jr.; and Frankel, Michael S.,3,647,168.

Franks, Neal E.; and Franks, Neal E., to Procter & Gamble Company, The Procter & Gamble Company, The. Enzymatically active composition having an insolubilized protease enzyme covalently bonded to a water insoluble polyanhydroglucose Enzymatically active composition having an insolubilized protease enzyme covalently bonded to a water insoluble polyanhydroglucose. 3,647,630, Cl. 195-63.

Franks, Neal E.: *See—*
Franks, Neal E.; and Franks, Neal E.,3,647,630.

Frederiksen, Thomas M., to Motorola, Inc. Differential trigger circuit. 3,648,069, Cl. 307-235.

Frederiksen, Thomas M.; and Russell, Ronald W., to Motorola, Inc. Power supply start circuit and amplifier circuit. 3,648,154, Cl. 323-22.

Freed, Meier E.: *See—*
Potoski, John R.; and Freed, Meier E.,3,647,790.

French, R. T., Company, The: *See—*
Tollefson, Charles I.; and Bice, Claude W., 3,647,486.

French, Roy E. Fishing simulator. 3,646,691, Cl. 35-29.

Fresard, Marcel, to Mefina S.A. Foldable support and cover flaps for a sewing machine. 3,646,900, Cl. 112-258.

Freudenberg, Carl, Kommanditgesellschaft: *See—*
Demme, Ernst; Schachowskoy, Theodor; Schuhmacher, Guenther; Fehlhaber, Juergen; and Hartmann, Ludwig, 3,647,594.

Frey, Albert: *See—*
Petrzilka, Theodor; Hofmann, Albert; Schenk, Hansruedi; Troxler, Franz; Frey, Albert; and Ott, Hans,3,647,801.

Frey, Alexander H., Jr.; Schlosburg, Burton E.; and Tygielski, Ralph E., to International Business Machines Corporation. Apparatus and method for obtaining synchronization of a maximum length pseudo-random sequence. 3,648,237, Cl. 340-146.1

Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
Busch, Carl Wilhelm; and Scheer, Kurt, 3,648,283.
Manthey, Harald, 3,647,327.
Wetzel, Rolf Emil; and Janssen, Willi, 3,647,417.

Frieder, Leonard P., to Gentex Corporation. Sailing jacket. 3,646,626, Cl. 9-342.

Friedman, Arnold I.; and Bartholomew, Ralph L., to General Electric Company. Application of conductive inks. 3,647,532, Cl. 117-212.

Friedman, Robert. Apparatus for moving a member to a selected position. 3,648,139, Cl. 318-265.

Fritock, William H.: *See—*
Wohgemuth, Larry G.; and Fritock, William H.,3,647,760.

Fritz, Edward A., to International Harvester Company. Forage harvester combination. 3,646,735, Cl. 56-14.7

Fritzinger, Larry B.; and Lepselter, Martin P., to Bell Telephone Laboratories, Incorporated. Method of eliminating pinhole shorts in an air-isolated crossover. 3,647,585, Cl. 156-17.

Frossard, Jacques Jean: *See—*
Weber, Abraham; Frossard, Jacques Jean; and Bouzard, Daniel,3,647,877.

Fruhwirth, Otto; and Schmidhammer, Ludwig, to Wacker-Chemie GmbH. Process for the purification of chlorinated hydrocarbons. 3,647,895, Cl. 260-650.

Fuchs, Edward O.; and Swisher, James H., to Bell Telephone Laboratories, Incorporated. Method of making a bronze-iron composite. 3,647,573, Cl. 148-101.

Fuji Photo Film Co., Ltd.: *See—*
Ohe, Keitaro; Niahio, Daijiro; and Sadamatsu, Shigeru, 3,647,773.
Ono, Hisatake; Watarai, Syu; and Katsuyama, Harumi, 3,647,428.

Fujii, Robert L., to Lear Siegler, Inc. Liquid cooling arrangement for dynamoelectric machine. 3,648,085, Cl. 310-54.

Fujii, Tatsuo, to Nippon Kogaku K.K. Exposure photometry system for photographic camera. 3,646,861, Cl. 95-10.

Fujishima, Satoru; and Honma, Hideo, to Murata Manufacturing Co., Ltd. FM Detecting circuit having a piezoelectric filter. 3,648,184, Cl. 329-198.

Fukata, Masayuki. Broadcast system for transmitting a plurality of control signals under protection against a false signal. 3,648,174, Cl. 325-64.

Fukuda, Takeji: *See—*
Tanaka, Eihachiro; Fukuda, Takeji; Yamaji, Kenkichi; Miyake, Yasuhiko; Ota, Hiroshi; and Kimura, Katsuo,3,646,796.

Fukuoka, Akira: *See—*
Ishizawa, Kazutomo; Nagata, Yasunori; Abe, Junnosuke; and Fukuoka, Akira,3,646,992.

Fukushima, Danji: *See—*
Yokotsuka, Tamotsu; Aonuma, Tatsuo; Mogi, Koya; Fukushima, Danji; Yasuda, Atsushi; Watanabe, Hiroharu; Tsukada, Naoshi; and Arai, Akira,3,647,484.

Fukutomi, Naoki: *See—*
Maeda, Yo; Suzuki, Satoshi; Nakamura, Yoshiharu; Masubuchi, Yorimitu; Ueyama, Tamotsu; Fukutomi, Naoki; and Takahashi, Hiroshi,3,646,670.

Fuller, Clyde R.: *See—*
Cunningham, James A.; Fuller, Clyde R.; and Wood, Samuel J., Jr.,3,647,663.

Fuller Company: *See—*
Solt, Paul E., 3,647,188.

Furlong, Donn B.; Luzaich, Samuel; and Forchini, James F., to Fluor Products Company, Inc. Fiberglass fan assembly. 3,647,317, Cl. 416-226.

Furuya, Tuneo: *See—*
Kondo, Eiroku; Usuda, Hirotaka; Suzuki, Hidemasa; and Furuya, Tuneo,3,647,981.

Fusselman, Robert M., to General Fireproofing Company, The. Pull. 3,646,634, Cl. 16-124.

Futera, Miroslav: *See—*
Kadera, Vaclav; Novotny, Josef; Vondruska, Miloslav; Feierfeil, Jiri; Svoboda, Vlastimil; Misarek, Dusan; Futera, Miroslav; Nacovska, Katerina; Janc, Zbynek; Nemec, Adolf; Penkava, Jiri; and Vitkovec, Zdenek,3,647,312.

Gagne, Albert A., to Grumman Aerospace Corporation. Fluidic devices with a negative pressure generating venturi. 3,646,951, Cl. 137-81.5

Gagne, Archie R. Slit trenching machine and cable layer. 3,647,003, Cl. 172-40.

Gagnon, Donald W.; and Tillman, James J., to Owens-Illinois, Inc. Polysulfones coated with organopolysiloxanes. 3,647,510, Cl. 117-46.

Gaito, Carl C.: *See—*
Barnard, John D.; Gaito, Carl C.; Giedo, Gary R.; Greene, Thomas G.; Lind, James W.; Perkins, Merlyn H.; and Pross, Charles M.,3,648,175.

Gale, W. D., Jr.: *See—*
Foster, Daniel S., 3,646,934.

Galerne, Jean, to Eugene-Gallia, Societe Anonyme. Dithiocarbazates and dithiocarbamates with acid and direct dyes. 3,647,350, Cl. 8-10.

Galigher Company, The: *See—*
Potts, John T.; Lange, Lawrence H.; and Liss, Thomas P., 3,647,066.

Galloway, James H., to Udylite Corporation. Controlled time ratio system. 3,648,078, Cl. 307-260.

Ganci, James B.; and Mastrangelo, Sebastian V. R., to Du Pont de Nemours, E. I., and Company. Process for electrolytic hydrodimerization of alpha, beta-unsaturated compounds. 3,647,651, Cl. 204-73.

Ganong, William L., Jr.; Bryant, Furnie S.; Neill, Henry R.; and Davies, Robert G., to Burlington Industries, Inc. Data monitoring system. 3,648,027, Cl. 235-92.

Gaon, Bernard; Goldfarb, Stuart; and Goldfarb, Adrienne R., said Gaon assor. to said Goldfarb, Stuart J., and Goldfarb, Adrienne R. Programmed time-responsive audio message and reminder device. 3,647,991, Cl. 179-100.2

Garcia-Rivera, Francisco: *See—*
Cancel, Luis E.; Rivera-Ortiz, Jose Manuel; and Garcia-Rivera, Francisco,3,647,062.

Gardner, Barrie: *See—*
Tucker, William M.; Gardner, Barrie; and Hayford, John W.,3,647,646.

Gardner, Donald J. Annunciator with timed illumination means. 3,648,273, Cl. 340-326.

Gardner, Joan E. Time controlled animal access permitting device. 3,646,912, Cl. 119-51.12

Gardner, Ray E., to Eastman Kodak Company. Ultrasonic film splicing apparatus. 3,647,599, Cl. 156-502.

Garetto, Bruno, to Olivetti, Ing. C., & C., S.p.A. Device for loading objects and conveying them from a loading station to at least one working station. 3,647,043, Cl. 198-19.

Garland, Wade H., Jr.: *See—*
Pinner, Champ D.; Sligh, Cecil E.; Diehl, James J.; and Garland, Wade H., Jr.,3,648,163.

Garlock Inc.: *See—*
Houghton, George E.; and Dixit, Sudhakar G., 3,646,846.

Garnett, Donald W., to Mahogany Farms, Inc., mesne. . 3,647,343, Cl.

Garnjost, Kenneth D.: *See—*
Hawk, George W.; Geyer, Lewis H.; Mastropole, Alfred J.; and Garnjost, Kenneth D.,3,646,762.

Garrett Corporation, The: *See—*
Norman, Leslie W.; Hunter, Skillman C.; and Perrone, George L., 3,646,761.

Gass, Harold D., Jr.: *See—*
Vesely, Kenneth D.; and Gass, Harold D., Jr.,3,647,911.

Gauthier, William D.; and Lierke, Ernst G., to Champion Spark Plug Company. Atomizer. 3,647,143, Cl. 239-342.

Gay, Guido, to Amplifon S.a.s. Signals modulator in audiometry apparatus. 3,648,196, Cl. 332-16.

Gazuit, Georges, to NRM Corporation. Radial tire making drum. 3,647,598, Cl. 156-415.

Gebr. Buhler Nachfolger GmbH: *See—*
Mieslinger, Winfried, 3,648,137.

Geering, Emil J.; and Stratton, George B., to Hooker Chemical Corporation. Process for the production of phenol sulfides. 3,647,885, Cl. 260-608.

Gehrig, Oskar: *See—*
Riehm, Theodor; and Gehrig, Oskar,3,647,369.

Geier, Adam, Ing., KG: *See—*
Geier, Walter, 3,646,625.

Geier, Walter, to Geier, Adam, Ing., KG. Inflatable suspenders. 3,646,625, Cl. 9-335.

Geipel, Hans; Schulz, Alfred; and Huber, Helmut, to Schloemann Aktiengesellschaft, and Huttenwerk Oberhausen Aktiengesellschaft. Device for collecting turns of rod or wire. 3,646,655, Cl. 29-200.

Geisler, Raymond E.; Hull, Leroy E.; and Kirschbaum, Michael E. Sound-type detection system. 3,647,974, Cl. 179-5.

Gellert, Dale A., to Procter & Gamble Company, The. Pressure sensitive tape fastener for disposable diapers. 3,646,937, Cl. 128-287.

Genbauffe, Francis Simon, to Robertshaw Controls Company. Burner construction and method of making the same or the like. 3,647,146, Cl. 239-559.

Gendle, Eric: *See—*
Head, Gordon Edwin; Jones, Kenneth Morgan; and Gendle, Eric,3,647,362.

General Electric Company: *See—*
Arand, John K., 3,646,763.
Barnett, Allen M.; Jensen, Harold A.; and Meikleham, Virginia F., 3,647,578.
Beggs, James E., 3,648,096.
Ben Daniel, David J.; Morgan, John R.; and Fielding, John O., 3,647,223.
Bennett, Moreland P., 3,648,014.
Berry, Alvin F., 3,647,921.
Bialous, Charles A., 3,647,747.
Bunch, Raymond S.; and Sanger, Richard B., 3,648,205.
Caltagirone, Saverio, 3,648,207.
Clark, Thomas J.; and Brown, Howard W., 3,647,511.
De Wolf, Frank T., 3,648,089.
Friedman, Arnold I.; and Bartholomew, Ralph L., 3,647,532.
Gillooly, George R.; and Rabatin, Jacob G., 3,647,707.
Grubb, Willard T.; and Macur, Robert A., 3,647,641.
Kelly, Jack L.; and Wiandt, Ronald K., 3,647,222.
Kim, Man Jin, 3,646,665.
Klein, Keith W., 3,647,224.
Koff, Bernard L., 3,647,313.
Lee, Daeyong, 3,647,085.
Leete, Bernard D., 3,648,147.
Levine, David J.; and Sherrill, Bruce E., Jr., 3,647,497.
Loeb, Leopold, 3,647,354.
McCray, Michael L., 3,648,223.
Renner, Charles F.; and Lipstein, Norman J., 3,648,086.
Schilling, Arthur G., 3,647,925.
Slonneger, John L., 3,648,214.
Tew, Walter Hosey, Jr., 3,648,037.

General Electric Compay: *See—*
Laessig, Rudolf R., 3,647,314.

General Engineering Company (Radcliffe) Limited: *See—*
Schofield, Richard Westwell, 3,647,153.

General Fireproofing Company, The: *See—*
Fusselman, Robert M., 3,646,634.
Hensch, Earl John; and Ogilvie, LeRoy Francis, 3,647,101.

General Foods Corporation: *See—*
Dame, Charles, Jr.; Stinson, William S., Jr.; and Capossela, Anthony C., 3,647,474.

General Instrument Corporation: *See—*
Russell, Edward J., 3,647,644.

General Mills Fun Group, Inc.: *See—*
Stine, George H., 3,646,887.

General Mills, Inc.: *See—*
Hasten, Mark; Jones, Lee S.; and Pommer, Denis L., 3,646,894.
Kamal, Marwan R.; and Kuder, Robert C., 3,647,852.
Kamal, Marwan R.; and Kuder, Robert C., 3,647,853.
Speech, Steven R.; Opie, Joseph W.; and Bridge, John A., 3,647,472.
Yueh, Mao Hsun, 3,647,482.

General Motors Corporation: *See—*
Atkinson, Ward J.; and Cole, Edward N., 3,646,876.
Brainard, Norman R.; and Holl, William H., 3,647,017.
Cox, John M., 3,647,556.
Dega, Robert L., 3,647,337.
Doty, Warren R.; and Knight, Bobbie D., 3,647,699.
Jacobs, James W., 3,648,280.
Lystad, Leonard A., 3,646,707.
Milton, Thomas J.; and Connell, Lehman J., 3,646,828.
Rice, Hal H.; and Dudash, James J., 3,646,993.
Sherman, Warren S.; Troth, Dennis L.; and Bennett, William A., 3,646,755.

General Processing Corporation: *See—*
Hollis, Russell E., Jr., 3,647,244.

General Refractories Company: *See—*
Salmi, Victor John, III, 3,646,722.

General Tire & Rubber Company, The: *See—*
Enlow, Dale S.; and Varner, Lawrence C., Jr., 3,647,608.
Grant, Bernard Carrington; and Reilly, John F., 3,647,260.

Gentex Corporation: *See—*
Frieder, Leonard P., 3,646,626.

Gerbetz, William: *See—*
Williams, Leon, Jr.; and Gerbetz, William,3,647,217.

Gerstenberg, Dieter; and Smith, Frank Thomas John, to Bell Telephone Laboratories, Incorporated. Technique for the fabrication of hafnium nitride resistor. 3,647,662, Cl. 204-192.

Gerster, John F., to Riker Laboratories, Inc., mesne. N-Cyanobenzoylhaloalkylsulfonanilides. 3,647,874, Cl. 260-556.

Gertsch, Ernst; and Gertsch, Ulrich. Ski-binding with friction reducing means between ski-boot and ski. 3,647,234, Cl. 280-11.35

Gertsch, Ulrich: *See—*
Gertsch, Ernst; and Gertsch, Ulrich,3,647,234.

Gerwitz, Paul F.: *See—*
DeLong, Robert J.; and Gerwitz, Paul F.,3,648,217.

Getselev, Zinovy Naumovich. Induction apparatus for continuous and semicontinuous casting. 3,646,988, Cl. 164-251.
Gevaert-Agfa N.V.: *See—*
Hofman, Emiel Alexander; Ghys, Theofiel Hubert; and Depoorter, Henri, 3,647,460.
Geyer, Lewis H.: *See—*
Hawk, George W.; Geyer, Lewis H.; Mastropole, Alfred J.; and Garnjost, Kenneth D.,3,646,762.
Geyer, Manvel A.: *See—*
Kernick, Andress; Geyer, Manvel A.; and Ernsberger, Glenn W.,3,648,150.
Ghys, Theofiel Hubert: *See—*
Hofman, Emiel Alexander; Ghys, Theofiel Hubert; and Depoorter, Henri,3,647,460.
Gibson, Harold F.: *See—*
Dodds, Thomas J., Jr.; Eagleson, Clegg; and Gibson, Harold F.,3,648,245.
Giddings & Lewis Machine Tool Company: *See—*
Mc Gee, John K., 3,648,244.
Giedo, Gary R.: *See—*
Barnard, John D.; Gaito, Carl C.; Giedo, Gary R.; Greene, Thomas G.; Lind, James W.; Perkins, Merlyn H.; and Pross, Charles M.,3,648,175.
Gieseking, Carl W.; and Sullivan,James D., to Monsanto Company. Oxidative treatment of polyphenyl thioethers. 3,647,752, Cl. 260-609.
Gilford Instrument Laboratories, Inc.: *See—*
Gilford, Saul R., 3,647,386.
Gilford, Saul R., to Gilford Instrument Laboratories, Inc. Sample processing container. 3,647,386, Cl. 23-230.
Gillespie, Helen A. Basket and tray. 3,647,077, Cl. 211-126.
Gillette Company, The: *See—*
Nigro, Louis V., 3,647,122.
Gillooly, George R.; and Rabatin, Jacob G., to General Electric Company. Alkali monosulfide recrystallization of lanthanide oxysulfide luminescent material. 3,647,707, Cl. 252-301.4
Gilman, Bruce Calvin: *See—*
Hettinger, Frederic Lee; and Gilman, Bruce Calvin,3,647,253.
Gilmour, Hugh S. A.: *See—*
Hendess, Raymond W.; and Gilmour, Hugh S. A.,3,647,452.
Gilson, Richard E.; and Rauner, Frederick J., to Eastman Kodak Company. Dyed photoresist compositions. 3,647,447, Cl. 96-35.1
Gineste, Robert Maurice, to Appareils de Precision et de Controle 'APC'. Control installation providing for smooth transfer between digital and analog controls. 3,648,032, Cl. 235-150.5
Ginsig, Robert, to Syntex Corporation. Process for preparing equilenin compounds. 3,647,831, Cl. 260-397.45
Giordano, Anthony J.: *See—*
Jacoby, Ian H.; Giordano, Anthony J.; and Fioretti, Warren H.,3,648,240.
Giorgianni, Edward J.: *See—*
Surash, John J.; Giorgianni, Edward J.; and Hotter, Lynn R.,3,647,461.
Surash, John J.; Giorgianni, Edward J.; and Hotter, Lynn R.,3,647,462.
Gissel, Hans, to Telefunken Patentverwertungsgesellschaft m.b.H. Plastic covered flexible waveguide formed from a metal coated dielectric layers. 3,648,201, Cl. 333-95.
Gits Bros. Mfg. Co.: *See—*
Lojkutz, Bruno V.; Warner, Dale J.; and Schulz, George H., 3,647,227.
Giuseppe, de Varda: *See—*
de Varda, Giuseppe; and de Pava, Alberto Vajina, 3,647,673.
G.K.N. Birfield Transmissions Limited: *See—*
Fisher, Leslie George, 3,646,778.
Glanzstoff AG: *See—*
Rupp, Hans-Dieter; and Magerlein, Helmut, 3,647,811.
Schulze, Ulrich; and Meyer, Gerhard, 3,647,878.
Glaser, Walter: *See—*
Burckhardt, Christoph; and Glaser, Walter,3,646,639.
Glass, Marvin, & Associates: *See—*
Barlow, Gordon A.; and Glass, Marvin I., 3,647,212.
Breslow, Jeffrey D., 3,647,216.
Glass, Marvin I.: *See—*
Barlow, Gordon A.; and Glass, Marvin I.,3,647,212.
Glattfelder, Henry G.: *See—*
Audeh, Azmi S.; Deodhar, Anil N.; and Glattfelder, Henry G.,3,648,134.
Glaxo Laboratories Limited: *See—*
Clark, John Colin; Cowley, Brian Richard; Gregory, Gordon Ian; Kennedy, James; and Long, Alan Gibson, 3,647,788.
Global Marine Inc.: *See—*
Norton, Thomas R., 3,647,007.
Glockner, Peter W.: *See—*
Bauer, Ronald S.; Glockner, Peter W.; Keim, Wilhelm; and Mason, Ronald F.,3,647,915.
Glockner, Peter W.; Keim, Wilhelm; and Mason, Ronald F., to Shell Oil Company. Ethylene oligomerization. 3,647,914, Cl. 260-683.15
Glogg, Herbert, to Glogg, Willy, A.G. Shoes. 3,646,692, Cl. 36-902.5
Glogg, Willy, A.G.: *See—*
Glogg, Herbert, 3,646,692.
Glover, William T.; and Kelly, Eugene W., to Squaires-Sanders, Inc., mesne. Low cost portable terminal device for electronic data processing. 3,647,972, Cl. 179-2.
Godet, Jean, to Service d'Exploitation Industrielle des Tabacs et des Allumettes. Duct for the transfer of materials at a variable flow rate. 3,646,971, Cl. 138-46.
Godin, Stig Olof; and Larsson, Karl Robert, to International Siporex Aktiebolaget. Apparatus for cutting semi-plastic bodies of cellular lightweight concrete. 3,646,643, Cl. 25-112.
Godwin, Roy Charles: *See—*
Allwright, Eric Sydney; and Godwin, Roy Charles,3,647,169.
Goings, Harford E. Disposable tray. 3,647,104, Cl. 220-20.
Goji Paper Mfg. Co., Ltd.: *See—*
Imai, Hisao, 3,647,518.
Goldberger, William M., to Corporacion de Fomento de la Produccion. Process for removing gangue from sulfur-bearing materials. 3,647,398, Cl. 23-312.
Goldfarb, Adrienne R.: *See—*
Gaon, Bernard; Goldfarb, Stuart; and Goldfarb, Adrienne R., 3,647,991.
Goldfarb, Adrienne R.: *See—*
Gaon, Bernard; Goldfarb, Stuart; and Goldfarb, Adrienne R.,3,647,991.
Goldfarb, Stuart: *See—*
Gaon, Bernard; Goldfarb, Stuart; and Goldfarb, Adrienne R.,3,647,991.
Goldie, Harry; Goldman, Michael A.; and Klein, Gerald, to Westinghouse Electric Corporation. Electrodeless pulsed illuminator. 3,648,100, Cl. 315-39.
Goldman, Martin; and Johnson, Arthur L., to Eastman Kodak Company. Photoconductive compositions and electrophotographic elements containing Group IVa or Group Va organo- metallic photoconductors. 3,647,429, Cl. 96-1.5
Goldman, Michael A.: *See—*
Goldie, Harry; Goldman, Michael A.; and Klein, Gerald,3,648,100.
Goldman, Wayne E., to Anderson Power Products, Inc. Electrical connector mounting rail and disconnecting assembly. 3,648,219, Cl. 339-45.
Goldsberry, Paul E., to International Business Machines Corporation. Audio responsive visual display system incorporating audio and digital information segmentation and co-ordination. 3,648,249, Cl. 340-172.5
Goldschmidt, Th., A.-G.: *See—*
Hofmann, Eberhard; and Holtschmidt, Ulrich, 3,647,808.
Goller, Robert L.: *See—*
Seiferth, Oscar E.; Goller, Robert L.; Grindrod, Paul E.; and Radloff, Harry L.,3,647,485.
Gomada, Nobuyasu; and Kosaka, Genzo, to Toyo Kogyo Co., Ltd. Induction hardened, anti-wear mechanical members. 3,647,577, Cl. 148-150.
Gonczi, Csaba: *See—*
Harsanyi, Kalman; Reiter, Jozsef; Korbonits, Dezso; Gonczi, Csaba; Takacs, Kalman; Bako, Erzsebet; Leszkovszky, Gyorgy; Tardos, Laszlo; and Vertesy, Csaba,3,647,809.
Goodale Manufacturing Company, Inc.: *See—*
Goodale, Richard J., 3,646,977.
Goodale, Richard J., to Goodale Manufacturing Company, Inc. Broccoli trimming machine. 3,646,977, Cl. 146-78.
Goodenough, Walter E., to Etronic Corporation. Gaging head for pneumatic bore gaging devices. 3,646,685, Cl. 33-143.
Goodrich, B. F., Company, The: *See—*
Hunt, David G., 3,647,342.
Goodyear Tire & Rubber Company, The: *See—*
Jackson, William E., 3,647,513.
Gor, Vishnu J.; and Manuel, Ernesto H., to Continental Can Company, Inc. Electron beam cross-linking of coating compositions containing ethylene unsaturated carboxylic acid copolymers and a melamine composition. 3,647,520, Cl. 117-93.31
Gorrell, John H., to King-Seeley Thermos Co., mesne. Method of making patterned metal coatings by selective etching of metal. 3,647,508, Cl. 117-38.
Goto, Kimio; and Nakamura, Hiroyasu, to Hitachi, Ltd. Random access discrete address system. 3,647,975, Cl. 179-15.
Goud, Eric G.: *See—*
Searle, Eric H.; and Goud, Eric G.,3,648,164.
Gould Inc.: *See—*
Biddick, Royce E., 3,647,543.
Gould-National Batteries, Inc.: *See—*
Mao, George W., 3,647,545.
Gouyet, Jean Pierre: *See—*
Deman, Pierre; and Gouyet, Jean Pierre,3,648,248.
Gower, Bob G.; and Poss, Richard F., to Sinclair Research, Inc. Coating composition. 3,647,732, Cl. 260-28.5
Graf, Stefano Arturo, to RCA Corporation. Reference voltage source. 3,648,153, Cl. 323-1.
Graff, Charles Russell: *See—*
Hilton, Joseph Lawrence; Graff, Charles Russell; and Cavin, Lewis Fred,3,646,766.
Grafton, Jim R.; Wilkins, Glenn E.; and Murphy, Joseph F., to Blackhawk Metal Products, Inc. Portable gas-fired cooking grill. 3,646,928, Cl. 126-41.
Grandmaison, John Paul: *See—*
Fabiano, Lucian Philip, Jr.; Grandmaison, John Paul; Greason, William Wallace, III; and King, Ted R., Jr.,3,647,980.
Grant, Benjamin M. Harvesting attachment. 3,646,737, Cl. 56-106.

Grant, Bernard Carrington; and Reilly, John F., to General Tire & Rubber Company, The. Replaceable seat insert and process of making. 3,647,260, Cl. 297-219.

Granville-Phillips Company: *See—*
Denison, Dean R.; and Morrison, Charles F., Jr., 3,648,046.

Grason, Rufus L.: *See—*
Arguimbau, Lawrence B.; and Grason, Rufus L.,3,647,968.

Grason-Stadler Company, Inc.: *See—*
Arguimbau, Lawrence B.; and Grason, Rufus L., 3,647,968.

Graviner (Colnbrook) Limited: *See—*
Hebblethwaite, Peter B., 3,647,109.

Gray, Robert P.; and Beal, John O., to Monterey Research Laboratory, Inc. Transmissibility controlled vibration testing apparatus and method. 3,646,807, Cl. 73-71.6

Gray, Wallie P.: *See—*
Millman, Victor; and Gray, Wallie P.,3,647,021.

Grazzini, Ferdinando: *See—*
Tagliafico, Giovan Battista; and Grazzini, Ferdinando,3,647,458.

Greason, William Wallace, III: *See—*
Fabiano, Lucian Philip, Jr.; Grandmaison, John Paul; Greason, William Wallace, III; and King, Ted R., Jr.,3,647,980.

Green, Albert W.: *See—*
Brown, Marion L., Jr.; Green, Albert W.; and Blanton, Elmer L.,3,647,412.

Green, Kelvin D., to Parker-Hannifin Corporation. Tube installation method. 3,646,662, Cl. 29-421.

Greenberg, Jacob, to Anti-Pollution Systems, Inc. Method of catalytically inducing oxidation of carbonaceous materials by the use of molten salts. 3,647,358, Cl. 23-2.

Greenblum, Car.: *See—*
Metz, Robert Lee; and Greenblum, Carl,3,648,270.

Greene, Clarence Kirk. Underwater communication between a vessel and a structure and vessel-positioning means. 3,646,771, Cl. 61-69.

Greene, Thomas G.: *See—*
Barnard, John D.; Gaito, Carl C.; Giedo, Gary R.; Greene, Thomas G.; Lind, James W.; Perkins, Merlyn H.; and Pross, Charles M.,3,648,175.

Greenfield, Stanley A., to Rohm and Haas Company. Method for preparing 4-substituted -1,2,4-thiazoles. 3,647,814, Cl. 260-308.

Greenside Machine Company, Limited: *See—*
Pentith, Gerald R. O., 3,647,265.

Greenwood, Arthur R.; and Vesely, Kenneth D., to Universal Oil Products Company. Continuous reforming-regeneration process. 3,647,680, Cl. 208-65.

Gregory, Gordon Ian: *See—*
Clark, John Colin; Cowley, Brian Richard; Gregory, Gordon Ian; Kennedy, James; and Long, Alan Gibson,3,647,788.

Greif, Herman J., Jr.: *See—*
Leising, Maurice B.; Greif, Herman J., Jr.; Kirberg, James R.; and Willson, Philip J.,3,647,393.

Greig, James W., to Woodall Industries Inc., mesne. Method for making foam panel. 3,647,588, Cl. 156-79.

Greil, Erich, to Forschungsgemeinschaft fur technisches Glas e.V. Method and apparatus for burning graduations symbols and lettering into glass articles. 3,647,506, Cl. 117-37.

Greitan, Zigurd Boleslavovich: *See—*
Berzin, Gunard Valdemarovich; Kalnin, Arvid Yanovich; Sushkov, Alexandr Fedorovich; Skrupsky, Voldemar Petrovich; Ziemelis, Andris Eduardovich; Soloviev, Boris Fedorovich; Leeniex, Karl Mikhailovich; Sovetin, Vladimir Kirilovich; Gulbis, Yan Karlovich; Dalbinsh, Yan Yanovich; Priede, Bruno Andreevich; Upman, Karl Kristapovich; Muzhits, Vitold Iosifovich; Junga, Yan Petrovich; Krogzem, Ivar Arnoldovich; Greitan, Zigurd Boleslavovich; and Rotsen, Karl Arturovich,3,646,687.

Gresch, Walter; Pilch, Horst; and Ruttener, Erwin, to Buss AG. Method and apparatus for continuously producing solutions and suspensions. 3,647,493, Cl. 106-187.

Griffin, James Richard: *See—*
Parkinson, Richard Grant; and Griffin, James Richard,3,647,144.

Griffith Laboratories, Inc., The: *See—*
Sair, Louis, 3,647,487.

Grignon, Robert Georges. *See—*
Croix-Marie, Francis Marie Jean; and Grignon, Robert Georges,3,647,018.

Grimes, John J. Lawn mower protective guard. 3,646,740, Cl. 56-320.2

Grimes, Kenneth, to Hamilton Kent Manufacturing Co. Resilient conduit seal. 3,647,229, Cl. 277-207.

Grimmer, Elmer J., to Westinghouse Electric Corporation. Condenser bushing with flexible conductor connections attached to the condenser elements. 3,647,938, Cl. 174-143.

Grimsby, F. Norman: *See—*
Buls, Vernon W.; and Grimsby, F. Norman,3,647,639.

Grindrod, Paul E.: *See—*
Seiferth, Oscar E.; Goller, Robert L.; Grindrod, Paul E.; and Radloff, Harry L.,3,647,485.

Groat, Marshall O., to Kingsberry Home Corporation. Closure mold for building panels. 3,646,714, Cl. 52-241.

Grochowski, Edward G.: *See—*
Castrucci, Paul P.; Grochowski, Edward G.; North, William D.; and Palfi, Thomas L.,3,648,130.

Grosbard, Gregory, to Strategic Metals Research, Inc. Card validating apparatus and method. 3,648,242, Cl. 340-149.

Gross, Gabriel, to Manufacture de Machines du Haut-Rhin. Apparatus for making propellants of powder strands. 3,647,200, Cl. 269-51.

Groszek, Aleksander Jerzy, to British Petroleum Company Limited, The. Molybdenum disulphide. 3,647,689, Cl. 292-25.

Grubb, Eugene L., to Du Pont de Nemours, E. I., and Company. Hexaarylbiimidazole-heterocyclic compound compositions. 3,647,467, Cl. 96-90.

Grubb, Willard T.; and Macur, Robert A., to General Electric Company. Reactant sensor and method of using same. 3,647,641, Cl. 204-1.

Gruczelak, Norman P.; and Pierce, Joe T., to Texas Instruments, Incorporated. Magnetic head with printed circuit coil. 3,648,264, Cl. 340-174.1

Grumman Aerospace Corporation: *See—*
Gagne, Albert A., 3,646,951.
Leftheris, Basil P., 3,646,791.

Grunwald, John J.; and D'Ottavio, Eugene D., to Mac Dermid Incorporated. Pretreatment of molded polyolefins for electroless plating. 3,647,512, Cl. 117-47.

Grunzweig & Hartmann AG: *See—*
Meyer, Erwin; Brendel, Klaus-Dieter; Blau, Hans; and Stoof, Gerhard, 3,647,022.

GTI Corporation: *See—*
Bailey, Richard J., 3,648,108.

Guevara, Alfredo R.: *See—*
Alsup, Michael J.; and Guevara, Alfredo R.,3,647,446.

Guidotti, Vincenzo: *See—*
Mortillaro, Luigi; Russo, Mario; and Guidotti, Vincenzo,3,647,765.

Guild, John R.: *See—*
Rauner, Frederick J.; Arcesi, Joseph A.; and Guild, John R.,3,647,443.

Gulbis, Yan Karlovich: *See—*
Berzin, Gunard Valdemarovich; Kalnin, Arvid Yanovich; Sushkov, Alexandr Fedorovich; Skrupsky, Voldemar Petrovich; Ziemelis, Andris Eduardovich; Soloviev, Boris Fedorovich; Leeniex, Karl Mikhailovich; Sovetin, Vladimir Kirilovich; Gulbis, Yan Karlovich; Dalbinsh, Yan Yanovich; Priede, Bruno Andreevich; Upman, Karl Kristapovich; Muzhits, Vitold Iosifovich; Junga, Yan Petrovich; Krogzem, Ivar Arnoldovich; Greitan, Zigurd Boleslavovich; and Rotsen, Karl Arturovich,3,646,687.

Gulf & Western Industrial Products Company: *See—*
Lomax, Donald L., 3,646,989.

Gulf & Western Industries: *See—*
Clark, Larry K., 3,648,233.

Gulf Research & Development Company: *See—*
Hazen, Stanley M.; and Heilman, William J., 3,647,923.
White, Frederick K., 3,647,714.

Gullick Dobson Limited, Inc.: *See—*
Whitaker, Michael E., 3,646,768.

Gullick Limited: *See—*
Pollard, Thomas, 3,646,769.

Gulton Industries, Inc.: *See—*
Alton, Ahdor H.; and Kohn, Mitchell I., 3,648,183.

Gump, Klaus H.; and Stuetz, Dagobert E., to Celanese Corporation. Process for formation of a cyclized acrylic vibrous material. 3,647,770, Cl. 260-85.5

Gunji, Naoki: *See—*
Yamagishi, Hidehisa; Gunji, Naoki; and Takeuchi, Masao,3,647,650.

Gunnarsson, Karl Einar, to Nyby Bruks Aktiebolag. Method of treating industrial waste water without contamination of the environment. 3,647,686, Cl. 210-48.

Gunze Kobunshi Kogyo Kabushiki Kaisha: *See—*
Sakurai, Masao; and Muto, Kikuo, 3,647,340.

Gurwicz, David, to Sevcon Engineering Limited. Chopper circuit. 3,648,151, Cl. 321-43.

Gustafson, Alan M.: *See—*
Purland, Donald A.; and Gustafson, Alan M.,3,646,751.

Gustavson, Lars-Goran; and Lindqvist, Per-Erik. Drive shaft couplings. 3,646,776, Cl. 64-11.

Gutmann, John T.: *See—*
Bernatt, Joseph; and Gutmann, John T.,3,647,996.

Guzak, John, Jr., to SCM Corporation. Data handling system. 3,648,247, Cl. 340-172.5

Guzzi, Alberto; Magagnoli, Remo; and Vittore, Lorenzo, to Societa per Azioni Ferrania. Photographic silver halide elements having magenta- colored coupler dyes. 3,647,468, Cl. 96-100.

Gyorgy, Ernst M.; Sherwood, Richard C.; and Van Uitert, Le Grand G., to Bell Telephone Laboratories, Incorporated. Magnetic devices. 3,648,260, Cl. 340-174.

Haag, Werner O.: *See—*
Caesar, Philip D.; Haag, Werner O.; and Wise, John J.,3,647,916.

Haden, Walter L., Jr.; and Dzierzanowski, Frank J., to Engelhard Minerals & Chemicals Corporation. Microspherical zeolitic molecular sieve composite catalyst and preparation thereof. 3,647,718, Cl. 252-455.

Hagen, Floyd W.: *See—*
De Leo, Richard V.; and Hagen, Floyd W.,3,646,811.

Hagen, Thomas E., to Ferroxcube Corporation. Transistorized current switch for memory systems. 3,648,060, Cl. 307-215.

Hahn, Hans-Jurgen Wilhelm, to Hamburger Flugzeugbau GmbH. Process for treating windshields of organic glass and, respectively, the outer layers thereof. 3,647,515, Cl. 117-62.

Hahne, Siegfried, to Messer. Grisheim GmbH. Apparatus for welding sheet metal. 3,647,130, Cl. 228-5.

Hahne, Siegfried, to Messer Griesheim GmbH. Apparatus for arranging parallel the edges of steel sheets to be welded. 3,647,131, Cl. 228-5.

Hahnle, Reinhard: *See—*
Meininger, Fritz; and Hahnle, Reinhard,3,647,813.

Haines, Derrick John, to United Kingdom of Great Britain and Northern Ireland, Minister of Technology in Her Britannic Majesty's Government of the. Ball bearings. 3,647,268, Cl. 308-193.

Haines, Robert Samuel, to International Business Machines Corporation. Magnetic compositions of praseodymium modified chromium oxide, methods of manufacture and magnetic recording media containing same. 3,647,540, Cl. 117-235.

Haist, Grant M.; King, James R.; and Pupo, David A., to Eastman Kodak Company. Stabilization of silver halide emulsions with 1,1 bis-sulfonyl aklames. 3,647,453, Cl. 96-61.

Hakki, Basil W., to Bell Telephone Laboratories, Incorporated. Indium aluminum phosphide and electroluminescent device using same. 3,648,120, Cl. 317-234.

Halbrand, Inc.: *See—*
Halford, George C., 3,646,628.

Halcon International, Inc.: *See—*
Hoch, Robert, 3,647,892.

Hale, Gordon H.; and Fay, James M. Remotely controlled grapple. 3,647,255, Cl. 294-111.

Halford, George C., to Halbrand, Inc. Combination toothbrush and pick. 3,646,628, Cl. 15-118.

Hall, John B., to International Flavors & Fragrances Inc. Indane derivatives. 3,647,826, Cl. 260-348.

Halliburton Company: *See—*
Manes, Dewey K.; Farley, David L.; and Wray, Gary Q., 3,646,995.
Seay, Orum E.; and Shelton, Robert O., 3,647,088.

Halmai, Attila; and Halmai, Geza, to Nikex Nehezipari Kulkereskedelmi. Traction unit for electric model railways. 3,646,892, Cl. 104-148.

Halmai, Geza: *See—*
Halmai, Attila; and Halmai, Geza,3,646,892.

Hamburger Flugzeugbau GmbH: *See—*
Hahn, Hans-Jurgen Wilhelm, 3,647,515.

Hamby, Tyler W., Jr.; and Strickland, William T., Jr., to Shell Oil Company. Epoxy resin sand consolidation rejuvenation. 3,646,999, Cl. 166-281.

Hamerski, Frank D., to Smith, A. O., Corporation. Method and apparatus for storage atmosphere control. 3,646,874, Cl. 98-1.5

Hamilton Kent Manufacturing Co.: *See—*
Grimes, Kenneth, 3,647,229.

Hammer, Kurt F., to Purolator Products, Inc. Pressure indicator and surge control device. 3,646,906, Cl. 116-70.

Hammes, Wilhelm, to Nauser Konmanditgesellschaft. Molded barrel. 3,647,110, Cl. 220-72.

Hanada, Hiroshi; and Kitajima, Nobuo, to Canon Camera Kabushiki Kaisha. Method of the preparation of CdS or Cd Se powder for electrophotography and method of making an electrophotgraphic photosensitive plate by using the powder. 3,647,430, Cl. 96-1.5

Hanadc, Hiroshi; Kitajima, Nobuo; and Masaki, Tatsuo, to Cannon Kabushiki Kaisha. Germanium and silicon additives to dual-layer electrophotographic plates. 3,647,427, Cl. 96-1.5

Hance, Richard J.; Wiese, John R.; and Clauss, Harry G., Jr., to Leeds & Northrup Company. Immersion molten metal sampler. 3,646,816, Cl. 73-425.4

Hanes, James W. E.; and Larralde, Edward, to Vetco Offshore Industries, Inc. Telescopic joint embodying a pressure actuated packing device. 3,647,245, Cl. 285-106.

Hanley, John J. Wheel chock. 3,647,029, Cl. 188-32.

Hann, Paul D., to Phillips Petroleum Company. Apparatus for forming filaments. 3,647,330, Cl. 425-76.

Hannan, William James, to RCA Corporation. Color encoding system utilizing two filters alternately for minimizing effects of image misregistration and image pickup device lag. 3,647,945, Cl. 178-5.4

Hansen, Gunnar W., to Ford Motor Company. Air cleaner and fuel vapor storage assembly remotely associated with an engine. 3,646,731, Cl. 55-316.

Hanson, Harold Biddick: *See—*
Rathjen, Theodore Nicholas; and Hanson, Harold Biddick,3,646,881.

Hansson, Malte. Propulsion and steering device for small boats. 3,646,903, Cl. 115-12.

Hara, Kazuhiko; and Imai, Hirozo, to Matsushita Denko Kabushiki Kaisha. Electromagnetic counter. 3,648,028, Cl. 235-92.

Hara, Shigeyoshi; Senoo, Masao; Yoshida, Tsunemasa; and Uchida, Moriya, to Teijin Limited. Copolyamideimine and copolyamidebenzimidazole, and processes for their preparation. 3,647,762, Cl. 260-78.

Hara, Tasuku: *See—*
Kubodera, Toshiya; Hara, Tasuku; and Makabe, Hideki,3,647,390.

Hardart, Alfred T.: *See—*
Faure, Louis H.; and Hardart, Alfred T.,3,647,334.

Harding, Billie R.: *See—*
Naugle, Gene O.; and Harding, Billie R.,3,646,679.

Hardwicke, James E.; Scheffler, Bernard; and Weisz, Herman S., to Lowenstein, M., & Sons, Inc. Preparation of flame retardant composition for cellulosic material. 3,647,734, Cl. 260-29.4

Hardy, Kenneth David, to Beecham Group Limited. α-(α-Carboxyacylamino) aralkylpencillins. 3,647,780, Cl. 260-239.1

Hargest, Thomas S. Apparatus for intravenous feeding and the like. 3,647,117, Cl. 222-100.

Harnsberger, Bobby G.: *See—*
Curtice, Beverly A.; and Harnsberger, Bobby G.,3,646,998.

Harper Associates, Inc: *See—*
Harper, Kenneth B.; and Tremblay, Hubert J., 3,648,143.

Harper, Kenneth B.; and Tremblay, Hubert J., to Harper Associates, Inc. Automatic work repeating mechanism. 3,648,143, Cl. 318-568.

Harper, Leonard Roy, to International Business Machines Corporation. High speed gating circuit. 3,648,072, Cl. 307-247.

Harrell, Marvin L.: *See—*
Nixon, Dalbro R. Jr.; McIlhenny, David J.; and Harrell, Marvin L.,3,647,116.

Harris, Allan E.; and Behnke, Wilbert E., to Harris-Hub Company, Inc. Bed frame assembly. 3,646,623, Cl. 5-181.

Harris, Richard A.: *See—*
Blitchington, Frank H., Jr.; and Harris, Richard A.,3,647,961.

Harris-Hub Company, Inc.: *See—*
Harris, Allan E.; and Behnke, Wilbert E., 3,646,623.

Harrison, William H.; and Cohn, Seymour B. Frequency selective attenuation apparatus. 3,648,200, Cl. 333-73.

Harrison, William J., to Allis-Chalmers Manufacturing Company. Removable drive unit for lift truck. 3,647,013, Cl. 180-13.

Harsanyi, Kalman; Reiter, Jozsef; Korbonits, Dezso; Gonczi, Csaba; Takacs, Kalman; Bako, Erzsebet; Leszkovszky, Gyorgy; Tardos, Laszlo; and Vertesy, Csaba, to Chinoin Gyogyszer-es Vegyeszeti Termekek Tyara Rt. Certain pyridyl-1,2,4-oxydiazole derivatives. 3,647,809, Cl. 260-296.

Hart, Dwight L.; Jaggers, Henry T.; and Walker, Charles S., to Industrial Nucleonics Corporation. System and method for optimizing processor or equipment profit. 3,648,035, Cl. 235-151.1

Hartco Company: *See—*
Lingle, Harrison C.; and Langas, Arthur, 3,647,593.

Hartlein, Robert C.; and Olson, Carl R., to Dow Corning Corporation. Method for promoting the reaction between a silicon- bonded hydroxyl radical and a silicon-bonded alkoxy radical. 3,647,846, Cl. 260-448.2

Hartman, David A.: *See—*
Swanson, John W.; Hartman, David A.; Beers, Russel L.; and Jamieson, Ernest J.,3,647,694.

Hartman, Wallace H. Tool for tensioning and holding roller chains. 3,647,186, Cl. 254-78.

Hartmann, Ludwig: *See—*
Demme, Ernst; Schachowskoy, Theodor; Schuhmacher, Guenther; Fehlhaber, Juergen; and Hartmann, Ludwig,3,647,594.

Hartzell, Harry F., Jr., to Koppers Company, Inc. Steep slope belt conveyor. 3,647,049, Cl. 198-192.

Harvey, James E.; Irland, Max J.; and Lindberg, Victor L., to Ford Motor Company. Glass window structures eliminating Jamin interference fringes. 3,647,285, Cl. 350-319.

Harwood, Leopold A. Control system. 3,647,940, Cl. 178-5.4

Hasegawa, Nobuo; and Kamo, Takahiro, to Matsushita Electric Industrial Co., Ltd. Heat resisting insulating materials for electric parts. 3,647,695, Cl. 252-62.

Hasegawa, Shinichi: *See—*
Ito, Ken; Kaminaka, Hiroshi; Kotera, Norio; Yamamoto, Shinji; Dohgane, Iwao; Shigehiro, Kosuke; Kuruma, Hiroshi; Chinuki, Takashi; Yoshitake, Hiroshi; Tanimoto, Kenji; Hasegawa, Shinichi; and Kobayasi, Nobuki,3,647,866.

Hasegawa, Shoji: *See—*
Matsushita, Toru; Suzuki, Kunimoto; and Hasegawa, Shoji,3,647,531.

Hashimoto, Hideo, to Ricoh Co., Ltd. Means for detecting slippage or stoppage of endless belt in copying machine. 3,647,206, Cl. 271-57.

Hasten, Mark; Jones, Lee S.; and Pommer, Denis L., to General Mills, Inc. Extruding and cutting dough. 3,646,894, Cl. 107-54.

Haswell, John N. Post partum blood loss receptacle. 3,646,938, Cl. 128-292.

Haugen, Gilbert R.: *See—*
Benson, Sidney W.; Haugen, Gilbert R.; and Jackson, Roland S.,3,647,387.

Hauser, Alfred: *See—*
Sennewald, Kurt; Hauser, Alfred; and Lork, Winfried,3,647,867.

Hausman, Earl Thomas: *See—*
Baugher, Dale Milton; and Hausman, Earl Thomas,3,648,116.

Hawk, George W.; Geyer, Lewis H.; Mastropole, Alfred J.; and Garnjost, Kenneth D., to Moog Inc. Secondary injection thrust vector control. 3,646,762, Cl. 60-204.

Hayashi, Kimiaki: *See—*
Watanabe, Toshio; Tsukamoto, Goro; Hayashi, Kimiaki; Sato, Masanori; and Iwasawa, Yoshio,3,647,799.

Hayashi, Yoshimasa: *See—*
Nakajima, Yasuo; and Hayashi, Yoshimasa,3,646,764.

Hayes, Brian: *See—*
Hayes, Edward J., Jr.; and Hayes, Brian,3,647,504.

Hayes, Edward J., Jr.; and Hayes, Brian. Pressure sensitive laminate. 3,647,504, Cl. 117-36.7

Hayes, George D.: *See—*
Anderson, Dwayne Roy, 3,647,232.

Hayes, John C., to Universal Oil Products Company. Dehydrogenation method and catalytic composite for use therein. 3,647,719, Cl. 252-466.

Hayes, Leonard L. Hand truck attachment. 3,647,236, Cl. 280-41.

Hayford, John W.: *See—*
Tucker, William M.; Gardner, Barrie; and Hayford, John W.,3,647,646.

Hays, Lance G.: *See—*
United States of America,National Aeronautics and Space Administration, Administrator, 3,648,083.

Hazen, Stanley M.; and Heilman, William J., to Gulf Research & Development Company. Resin compositions containing hindered phenols. 3,647,923, Cl. 260-878.

Head, Gordon Edwin; Jones, Kenneth Morgan; and Gendle, Eric, to Imperial Chemical Industries Limited. Polyester catalyst recovery. 3,647,362, Cl. 23-22.

Heald, Jerome Ingles. Bedpan washer with pistol type nozzle. 3,646,617, Cl. 4-1.

Heaton, Richard A.; and Sachs, Maurice J., to Owens-Illinois, Inc. Glass ribbon machine blow head mechanism. 3,647,410, Cl. 65-184.

Hebblethwaite, Peter B., to Graviner (Colnbrook) Limited. Containers for fluid under pressure, such as fire extinguishers. 3,647,109, Cl. 220-47.

Hegedus, Balthasar, to Hoffmann-La Roche Inc. Triphenylmethyl imidazoles. 3,647,815, Cl. 260-309.

Heidelberg, Frederic H.: *See—*
Asbill, Clarence M.; and Heidelberg, Frederic H.,3,646,942.

Heiligenthal, Harry E.; and Nichols, Arthur E., Jr., to Dayco Corporation. Roller structure. 3,646,652, Cl. 29-130.

Heilman, William J.: *See—*
Hazen, Stanley M.; and Heilman, William J.,3,647,923.

Heilmann, Horst: *See—*
Scholtis, Walter; Ploch, Siegfried; Schattauer, Friedrich; Schonfuss, Martin; and Heilmann, Horst,3,646,781.

Heiman, Frederic Paul, to RCA Corporation. Method of making high area-density array photomasks having matching registry. 3,647,438, Cl. 96-27.

Heimann, Egon. Lateral file. 3,647,076, Cl. 211-88.

Hein, Theodore F.: *See—*
Claessens, Frans D.; and Hein, Theodore F.,3,647,345.

Heinrich, Peter, Jr.: *See—*
Niccum, Forest G.; Kudlaty, Walter J.; Dauer, Charles W.; and Heinrich, Peter, Jr.,3,647,083.

Heinrich Sudhaus Sohne Metallwarenfabrik: *See—*
Norrenberg-Sudhaus, Ernst, 3,646,787.

Heller, Paul R.; Brenner, William C.; and Philossky, Harold M., to Westinghouse Electric Corporation. Transposed conductor for dynamoelectric machines. 3,647,932, Cl. 174-34.

Helm, Edward J., to Koppers Company, Inc. System for collecting dust and smoke when coke is pushed from a coke oven. 3,647,636, Cl. 202-263.

Helm, Herbert W., to Smithe, F. L., Machine Company, Inc. Apparatus for aligning the pins on aligner chains of an envelope machine. 3,646,858, Cl. 93-62.

Hendess, Raymond W.; and Gilmour, Hugh S. A., to Eastman Kodak Company. Direct reversal photographic element and process. 3,647,452, Cl. 96-55.

Henkel & Cie GmbH: *See—*
Kaloff, Hans K., 3,647,869.

Henn, Friedrich Gerhard: *See—*
Wollner, Johannes; Cherubim, Martin Karl; and Henn, Friedrich Gerhard,3,647,918.

Henning, Walter, to Zimmermann, Jos., Messrs. Sleeve for reeling up and/or wet treating yarn or thread. 3,647,156, Cl. 242-118.1

Henrici, Gisela Henrici; and Martin, Salvador Olive, to Monsanto Company. Process for preparing 1,4-hexadiene. 3,647,902, Cl. 260-680.

Hensch, Earl John; and Ogilvie, LeRoy Francis, to General Fireproofing Company, The. Filing device. 3,647,101, Cl. 220-4.

Henschel-Steinau Co.: *See—*
Fortunato, Vincent, 3,647,078.

Hentzschel, Wolfgang: *See—*
Kuchenthal, Gunther; and Hentzschel, Wolfgang,3,646,689.

Hepps, Michael B. L.; and Ferrari, Harry M., to Westinghouse Electric Corporation. Fuel element for a nuclear reactor. 3,647,623, Cl. 176-68.

Hercules Incorporated: *See—*
Walker, John F., 3,647,759.

Herd, Harold H.: *See—*
Buckingham, Robert L.; and Herd, Harold H.,3,647,501.

Herd, Harold H.; and Sun, Theresa I., to International Business Machines Corporation. Method of making conductive silver images and emulsion therefor. 3,647,456, Cl. 96-38.4

Herron, Lorne Robert: *See—*
Lauber, Ernst Abraham; and Herron, Lorne Robert,3,647,263.

Hershberg, David E., to International Telephone and Telegraph Corporation. Multiplex FM transmitter. 3,648,178, Cl. 325-145.

Hertel, Heinrich; and Ruppin, Dietrich, said Ruppin assor. to said Hertel. Apparatus for shock-deformation of workpieces. 3,646,792, Cl. 72-56.

Hettinger, Frederic Lee; and Gilman, Bruce Calvin, to Ocean Systems, Incorporated. Capture device. 3,647,253, Cl. 294-66.

Hetzel, Marvin E.: *See—*
Cervenka, Joseph J.; and Hetzel, Marvin E.,3,646,654.

Heuser, Gerhard: *See—*
Mose, Luciano; and Heuser, Gerhard,3,647,670.

Hibi, Masao: *See—*
Eto, Yoshizumi; and Hibi, Masao,3,647,947.
Eto, Yoshizumi; and Hibi, Masao,3,647,948.

Hicks, Robert E., to United States of America, Navy, mesne. Substrate bonding bumps for large scale arrays. 3,647,533, Cl. 117-212.

Higuchi, Toshikazu: *See—*
Ono, Hiroshi; and Higuchi, Toshikazu,3,647,850.

Hilgers, Giovanni; Hitzemann, Gerhard; and Kulling, Achim, to Titangesellschaft mbH. Process for the manufacture of fine particle size titanium dioxide by reacting titanium tetrachloride with oxygen. 3,647,377, Cl. 23-202.

Hill, David Roderic, to International Standard Electric Corporation. Speech recognition apparatus. 3,647,978, Cl. 179-15.

Hill, Thomas, to BP Chemicals, Limited. Production of silica gels. 3,647,709, Cl. 252-317.

Hillers, Theo, to Dynamit Nobel AG. High frequency welding of polyvinyl chloride foams to perforated materials. 3,647,607, Cl. 161-89.

Hilton, Joseph Lawrence; Graff, Charles Russell; and Cavin, Lewis Fred, to Raymond International Inc. Installation of sand drains. 3,646,766, Cl. 61-11.

Himmel, Leon, to International Telephone and Telegraph Corporation. Transmitter for distance measuring system. 3,648,177, Cl. 325-141.

Himmelfarb, Philip: *See—*
Johnson, Dennis E.; Woodland, Lawrence R.; Kensler, Charles J.; and Himmelfarb, Philip,3,647,632.

Hinchman, Gerald V.; Sommerville, James L.; and Schmitz, William D., to Bio-Dynamics, Inc. Pipette. 3,646,817, Cl. 73-425.6

Hinkley, David F.; and Conn, John B., to Merck & Co., Inc. Process for preparing 1-benzylidene-3-indenyl acetic acids. 3,647,858, Cl. 260-470.

Hinterholzl, Ernst, to Vereinigte Osterreichische Eisen-und Stahlwerke Aktiengesellschaft. Rolling stand, particularly for shaping a cast bar immediately upon leaving a continuous casting plant, and rolling mill. 3,646,795, Cl. 72-238.

Hirafuji, Ban, to Ricoh Co., Ltd. Coiled spring energy control device. 3,646,832, Cl. 74-519.

Hirai, Mitsuo: *See—*
Imai, Masaya; Izubayashi, Masuji; Takiyama, Keiichi; Hirai, Mitsuo; and Nikki, Masao,3,647,904.

Hiraoka, Hiroyuki: *See—*
Srinivasan, Rangaswamy; and Hiraoka, Hiroyuki,3,647,656.

Hironaka, Jouji: *See—*
Shoji, Osamu; Hironaka, Jouji; and Kotani, Hirotada,3,647,626.

Hirooka, Masaaki: *See—*
Nakaguchi, Kohei; Kawasumi, Shohachi; Hirooka, Masaaki; Yabuuchi, Hiroshi; and Takao, Hiroyoshi,3,647,753.
Nakaguchi, Kohei; Kawasumi, Shohanchi; Hirooka, Masaaki; and Yabuuchi, Hiroshi,3,647,771.

Hirosawa, Koichiro: *See—*
Kubo, Seitoku; Ohnuma, Kiyoshi; and Hirosawa, Koichiro,3,646,836.

Hirsch, Donald, to Bell Telephone Laboratories, Incorporated. Adaptive equalizer for digital data systems. 3,648,171, Cl. 325-42.

Hitachi Cable Limited: *See—*
Tanaka, Eihachiro; Fukuda, Takeji; Yamaji, Kenkichi; Miyake, Yasuhiko; Ota, Hiroshi; and Kimura, Katsuo, 3,646,796.

Hitachi Chemical Co., Ltd.: *See—*
Maeda, Yo; Suzuki, Satoshi; Nakamura, Yoshiharu; Masubuchi, Yorimitu; Ueyama, Tamotsu; Fukutomi, Naoki; and Takahashi, Hiroshi, 3,646,670.

Hitachi, Ltd.: *See—*
Eto, Yoshizumi; and Hibi, Masao, 3,647,947.
Eto, Yoshizumi; and Hibi, Masao, 3,647,948.
Goto, Kimio; and Nakamura, Hiroyasu, 3,647,975.
Ikegami, Kazutoshi; Ikeda, Hideo; Takeuchi, Kazumi; Kitamura, Kosuke; and Takahashi, Susumu, 3,648,179.
Kondo, Eiroku; Usuda, Hirotaka; Suzuki, Hidemasa; and Furuya, Tuneo, 3,647,981.
Murato, Kenichi; Takei, Kenji; and Takayama, Masayuki, 3,646,891.
Takemoto, Takeo; Miyata, Yoshihiko; and Kawamura, Takao, 3,647,960.

Hittmair, Paul: *See—*
Nitzsche, Siegfried; Kaiser, Wolfgang; Wohlfarth, Ernst; and Hittmair, Paul,3,647,725.

Hitzemann, Gerhard: *See—*
Hilgers, Giovanni; Hitzemann, Gerhard; and Kulling, Achim,3,647,377.

Hives, Paul M. Door hinge. 3,646,636, Cl. 16-140.

Hobart Manufacturing Company, The: *See—*
Athey, Stuart E., 3,646,948.

Hoch, Robert, to Halcon International, Inc. Preparation of ethylene glycol. 3,647,892, Cl. 260-635.

Hoch, Samuel: *See—*
Brook, John W.; and Hoch, Samuel,3,647,748.

Hochreiter, William T., to Eastman Kodak Company. Flashlamp sensing and percussive firing mechanism for photographic apparatus. 3,646,864, Cl. 95-11.5

Hoefliger & Karg: *See—*
Wurst, Helmut; and Matthis, Hans, 3,646,631.

Hoeg, Donald F.: *See—*
Schlott, Richard J.; Hoeg, Donald F.; and Pendleton, John F.,3,647,803.

Hoehne, Gerd: *See—*
Soehner, Gerhard; and Hoehne, Gerd,3,648,155.

Hoffman, Joseph K.; and Russell, James P., to Air Products and Chemicals, Inc., mesne. Preparation of vinyl ester-toluene telomers. 3,647,862, Cl. 260-491.

Hoffman, Wiliiam K., to International Business Machines Corporation. Storage circuit for shift register. 3,648,065, Cl. 307-221.

Hoffman, William K.; and Sumilas, John W., to International Business Machines Corporation. Modified storage circuit for shift register. 3,648,063, Cl. 307-221.

Hoffmann, Peter: *See—*
Marquarding, Dieter; Ugi, Ivar V.; Kleimann, Helmut; and Hoffmann, Peter,3,647,775.

Hoffmann-La Roche Inc.: *See—*
Hegedus, Balthasar, 3,647,815.

Hofling, Erich; and Breu, Hanspeter, to Swiss Aluminium, Ltd. Method of making lacquer coatings by means of electro-phoretic deposition. 3,647,658, Cl. 204-181.

Hofman, Emiel Alexander; Ghys, Theofiel Hubert; and Depoorter, Henri, to Gevaert-Agfa N.V. Method of producing photographic images by rapid processing. 3,647,460, Cl. 96-66.

Hofmann, Albert: *See—*
Petrzilka, Theodor; Hofmann, Albert; Schenk, Hansruedi; Troxler, Franz; Frey, Albert; and Ott, Hans,3,647,801.

Hofmann, Eberhard; and Holtschmidt, Ulrich, to Goldschmidt, Th., A.-G. N-Substituted diaminopyridines. 3,647,808, Cl. 260-296.

Hohmann, John F. Portable shooting gallery and gun cart. 3,647,214, Cl. 273-105.6

Holbrook, Le Grand K.; and Ostler, David S., to Medical Development Corporation. Fluid collection systems. 3,646,935, Cl. 128-276.

Holl, William H.: *See—*
Brainard, Norman R.; and Holl, William H.,3,647,017.

Holland, John H., to Arkansas Rock and Gravel Co. Material delivery system. 3,647,096, Cl. 214-83.36

Holland, Thomas E.: *See—*
Buck, Willard E.; and Holland, Thomas E.,3,647,956.

Holler, George J., Jr. Filter assembly and system for the removal of coal dust. 3,646,728, Cl. 55-233.

Holley, Danforth, to Holley Plastics Company. Painted golf ball method and structure. 3,647,221, Cl. 273-235.

Holley Plastics Company: *See—*
Holley, Danforth, 3,647,221.

Hollis, Russell E., Jr., to General Processing Corporation. Coupler for trailers and the like. 3,647,244, Cl. 280-512.

Holloway, Henry, to Ford Motor Company. Vacuum deposition. 3,647,197, Cl. 263-47.

Holophane Company, Inc.: *See—*
Wince, Vearl S., 3,647,148.

Holotron Corporation: *See—*
Weber, Bob L., 3,647,289.

Holstead, Colin. Carbazolylemthane dye salts as sensitizers for photoconductive compositions. 3,647,432, Cl. 96-1.6

Holtermann, Theodore J.: *See—*
Wick, Gerald H.; and Holtermann, Theodore J.,3,647,024.

Holtkamp, Calvin J., to Westinghouse Electric Corporation. Oven latch operated feature switch. 3,648,011, Cl. 219-413.

Holtkamp, Calvin J., to Westinghouse Electric Corporation. Oven control system including single dial control. 3,648,012, Cl. 219-413.

Holtschmidt, Ulrich: *See—*
Hofmann, Eberhard; and Holtschmidt, Ulrich,3,647,808.

Honda, Ichiro: *See—*
Okamoto, Kazuo; Eguchi, Naoki; Sakao, Nasuo; Honda, Ichiro; and Suzuki, Eizo,3,647,571.

Honeywell Inc.: *See—*
Buttweiler, Thomas B.; and Titus, Joseph S., 3,648,056.
Kane, Hugh, 3,648,203.
Sanford, Douglas C., 3,648,105.
Scheer, David W., 3,648,141.
Thron, John E.; Woods, William E.; Bellettiere, Ronald; and Stein, Howard, 3,648,252.

Honeywell Information Systems Inc.: *See—*
Ripplinger, Roland E., 3,648,168.

Honig, William. Collapsible luggage bag. 3,647,035, Cl. 190-45.

Honma, Hideo: *See—*
Fujishima, Satoru; and Honma, Hideo,3,648,184.

Hooker Chemical Corporation: *See—*
Geering, Emil J.; and Stratton, George B., 3,647,885.
Lee, Sung Ki, 3,647,757.
Lee, Sung Ki, 3,647,919.

Hoover Ball and Bearing Company: *See—*
Wiese, Delmar R., 3,647,106.

Horikawa, Yoshikazu: *See—*
Ogi, Hideo; Ozaki, Haruo; Mishiro, Masaru; Horikawa, Yoshikazu; and Mori, Shunji,3,646,772.

Horizons Incorporated: *See—*
Wainer, Eugene, 3,647,422.

Hornung, Louis M.: *See—*
Davis, William H.; Hornung, Louis M.; Lindsey, Royce D.; and Tanner, Howard C.,3,647,041.

Horvath, Roland J.; and Parson, Charles G., to Diamond Shamrock Corporation. Coated chlorine generating materials for treating fluids. 3,647,523, Cl. 117-100.

Hosaki, Yoshihiko: *See—*
Takehisa, Masaaki; Kawakami, Waichiro; Nakajima, Hayato; and Hosaki, Yoshihiko,3,646,950.

Hosoi, Susumu: *See—*
Watanabe, Jun; Hosoi, Susumu; Kuwazaki, Masahiro; Ota, Akira; Takata, Toshikatsu; and Asaoka, Junichi,3,647,552.

Hotter, Lynn R.: *See—*
Surash, John J.; Giorgianni, Edward J.; and Hotter, Lynn R.,3,647,461.
Surash, John J.; Giorgianni, Edward J.; and Hotter, Lynn R.,3,647,462.

Houghton, George E.; and Dixit, Sudhakar G., to Garlock Inc. Fibrous graphite packing. 3,646,846, Cl. 87-1.

Houser, Philip H., to Mead Corporation, The. Coating head sub-assembly with clean out port. 3,647,138, Cl. 239-104.

Howard, Webster E., Jr.; Ludeke, Rudolf; and Stiles, Phillip J., to International Business Machines Corporation. Gated metal-semiconductor transition device. 3,648,124, Cl. 317-235.

Howe, Guy E. Device for sensing overcurrent and ground leakage current. 3,648,111, Cl. 317-18.

Howell, William E.; and Ostroff, Aaron J., to United States of America, National Aeronautics and Space Administration. Star image motion compensator. 3,647,276, Cl. 350-916.

Howlett, Peter Michael: *See—*
Stowell, Keith Christopher; and Howlett, Peter Michael,3,647,473.

Hoyer, Karl: *See—*
Wilke, Gerhard; Schnell, Gerhard; and Hoyer, Karl,3,647,014.

Hubbard, Vance M.: *See—*
Tims, Jerry L.; and Hubbard, Vance M.,3,648,109.

Huber, Helmut: *See—*
Geipel, Hans; Schulz, Alfred; and Huber, Helmut,3,646,655.

Huber, William R., III: *See—*
Embree, Milton L.; and Huber, William R., III,3,648,170.

Huckstadt, Harald; Saleck, Wilhelm; Randolph, August; and Moll, Franz, to Agfa-Gevaert Aktiengesellschaft. Bisaminoalkyl disulfides as sensitizers and stabilizers for silver halide emulsions. 3,647,469, Cl. 96-107.

Hudson, Russell L.; Williams, Kenneth C.; and Smith, Martin B., to Ethyl Corporation. Mixed nitroso hydrocarbons. 3,647,777, Cl. 260-143.

Hughes, Harold W.; and Shutt, Paul B., to Bendix Corporation, The. Secondary piston stop-wire retainer ring. 3,646,759, Cl. 60-54.6

Hull, Leroy E.: *See—*
Geisler, Raymond E.; Hull, Leroy E.; and Kirschbaum, Michael E.,3,647,974.

Hulslander, William L., to Dresser Industries, Inc. Valve with controlled seal deflection. 3,647,181, Cl. 251-317.

Hultquist, Gordon W., to Coach and Car Equipment Corporation. Tamper-proof ticket holder for commuter seat. 3,647,259, Cl. 297-194.

Humlong, Robert F.: *See—*
Pawsat, Carlton P.; and Humlong, Robert F.,3,647,242.

Humphrey, James R.: *See—*
Christie, Joseph H.; and Humphrey, James R.,3,647,549.

Humphreys, Thomas F. Accessory receptacle. 3,647,059, Cl. 206-58.

Hunt, David G., to Goodrich, B. F., Company, The. Apparatus for vulcanizing open end belting. 3,647,342, Cl. 425-330.

Hunt, Jerry Donald: *See—*
Kay, Edward Leo; Hunt, Jerry Donald; and Spitz, Robert Paul,3,647,739.

Hunter, Clarence S., to Eastman Kodak Company. Title backed photosensitive microfiche. 3,647,454, Cl. 96-67.

Hunter, Joe S.: *See—*
Little, Little J.; and Hunter, Joe S.,3,646,818.

Hunter, John M., to Chandler Evans, Inc. Fluid oscillator. 3,646,952, Cl. 137-81.5

Hunter, Skillman C.: *See—*
Norman, Leslie W.; Hunter, Skillman C.; and Perrone, George L.,3,646,761.

Huntrup, Antonius: *See—*
Konig, Karl-Heinz; and Huntrup, Antonius,3,646,732.

Hunziker, Heinrich E.: *See—*
Dahms, Harald; and Hunziker, Heinrich E.,3,648,281.

Huppe, Justin, Kommanditgesellschaft: *See—*
Klann, Horst, 3,646,985.

Hurd, Stanley E.; and Fong, Leong Q., to Bangor Punta Operations, Inc. Velocity control system for air conveyors. 3,647,266, Cl. 302-31.

Hurtt, Terry J., to All-Steel Equipment Inc. Liquid tight connector. 3,647,934, Cl. 174-65.

Huska, Paul A.; Meissner, Herman P.; and Lamb. Thomas J., to Little, Arthur D., Inc. Method and apparatus for converting aluminum nitrate solutions to alpha alumina. 3,647,373, Cl. 23-142.

Hutcheson, James L., to Reynolds Metals Company. Method of obtaining dry, uncontaminated seals on flexible pouches. 3,646,726, Cl. 53-29.

Hutchins, Frank B. Attachment for a riding type lawn mower. 3,646,736, Cl. 56-16.9

Hutchins, Jonathan E. C.: *See—*
Kreevoy, Maurice M.; Borch, Richard F.; and Hutchins, Jonathan E. C.,3,647,890.

Hutchinson, William Earl, to Stauffer-Wacker Silicone Corporation, mesne. Stabilized heat curable silicone elastomers. 3,647,741, Cl. 260-37.

Huttenwerk Oberhausen Aktiengesellschaft: *See—*
Geipel, Hans; Schulz, Alfred; and Huber, Helmut, 3,646,655.

Hutton, Walter C. Service tap tool. 3,646,954, Cl. 137-318.

Huyssen, Phillip H. Rider-propelled vehicle. 3,647,241, Cl. 280-221.

Hydril Company: *See—*
Le Rouax, Robert K., 3,647,174.

Hydro Chemical & Mineral Corporation: *See—*
Osdor, Asriel, 3,647,638.

Hydro-Aire Division: *See—*
Fox, Leonard N., 3,647,328.

Hydronautics, Incorporated: *See—*
Tulin, Marshall P., 3,647,521.

Hyowa Hakko Kogyo Co., Ltd.: *See—*
Yamamoto, Atsushi; Omori, Tairiku; and Yasui, Hiroshi, 3,647,629.

Identimation Corporation: *See—*
Jacoby, Ian H.; Giordano, Anthony J.; and Fioretti, Warren H., 3,648,240.

Ikeda, Hideo: *See—*
Ikegami, Kazutoshi; Ikeda, Hideo; Takeuchi, Kazumi; Kitamura, Kosuke; and Takahashi, Susumu,3,648,179.

Ikeda, Takuo: *See—*
Sigiyama, Hiroshi; Ikeda, Takuo; and Itani, Takashi,3,647,827.

Ikeda, Yoshitsugi, to Olympus Optical Co., Ltd. Telephotographic objective having six lenses forming four lens groups. 3,647,281, Cl. 350-222.

Ikegami, Kazutoshi; Ikeda, Hideo; Takeuchi, Kazumi; Kitamura, Kosuke; and Takahashi, Susumu, to Hitachi, Ltd. Control device with a plurality of controlling units which are simply adjustable both individually and simultaneously to desirable conditions. 3,648,179, Cl. 325-399.

Ikegami, Renpei: *See—*
Suzuki, Yasuhiro; Ikegami, Renpei; and Kishimoto, Takuo,3,647,090.

Illinois Tool Works Inc.: *See—*
Erickson, Lloyd A., 3,646,669.
Rayburn, Charles C., 3,648,132.

Imai, Hirozo: *See—*
Hara, Kazuhiko; and Imai, Hirozo,3,648,028.

Imai, Hisao, to Goji Paper Mfg. Co., Ltd. Crystal paper having metallic luster. 3,647,518, Cl. 117-71.

Imai, Masaya; Izubayashi, Masuji; Takiyama, Keiichi; Hirai, Mitsuo; and Nikki, Masao, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Process for the preparation of unsaturated polyester resin. 3,647,904, Cl. 260-861.

Impact Plastics, Inc.: *See—*
Murray, Coyt E.; and Boyter, Walter C., 3,646,746.
Murray, Coyt E., 3,646,973.

Imperial Chemical Industries Limited: *See—*
Andrew, Herbert Francis; and Stead, Cecil Vivian, 3,647,778.
Bagai, Satish Kumar; and Topham, Arthur, 3,647,496.
Baldwin, Tony Lewis; and Burton, Roy Harold, 3,646,745.
Head, Gordon Edwin; Jones, Kenneth Morgan; and Gendle, Eric, 3,647,362.

Improved Machinery Inc.: *See—*
Vogel, Karl E., 3,647,067.

Inaba, Shigeho: *See—*
Arasaki, Seitetsu; Yamamoto, Hisao; and Inaba, Shigeho,3,647,785.

Inca Metal Products Corporation: *See—*
Denny, Denny A., 3,647,080.

Industrial Nucleonics Corporation: *See—*
Hart, Dwight L.; Jaggers, Henry T.; and Walker, Charles S., 3,648,035.

Industrial Science and Technology, Agency of: *See—*
Suzuki, Hideo; Ozawa, Yoshiko; and Tanabe, Osamu, 3,647,625.
Tsuda, Minoru, 3,647,470.

Ingress-Plastene, Inc.: *See—*
van Riper, Richard W., Jr., 3,646,622.

Inoue, Takashi; and Abe, Yoshiaki, to Diesel Kiki Kabushiki Kaisha. Electromagnetic fuel injection control system for internal-combustion engines. 3,646,916, Cl. 123-32.

Institute of Gas Technology: *See—*
Bodle, William W.; and Anderson, Philip J., 3,646,765.

Intermountain Research & Engineering Co., Inc.: *See—*
Clay, Robert B., 3,646,844.

International Business Machines Corporation: *See—*
Alberts, Gene S.; and Flur, Barry L., 3,647,643.
Barnard, John D.; Gaito, Carl C.; Giedo, Gary R.; Greene, Thomas G.; Lind, James W.; Perkins, Merlyn H.; and Pross, Charles M., 3,648,175.
Beausoleil, William F., 3,648,254.
Beausoleil, William F.; Ordemann, Fred A., Jr.; Pricer, Wilbur D.; and Vogl, Norbert G., Jr., 3,648,255.
Black, John C.; and Buckley, Frederick, 3,648,061.
Buckingham, Robert L.; and Herd, Harold H., 3,647,501.
Carter, William C.; Duke, Keith A.; and Jessep, Donald C., Jr., 3,648,239.
Castrucci, Paul P.; Grochowski, Edward G.; North, William D.; and Palfi, Thomas L., 3,648,130.
Closs, Felix H.; Seitzer, Dieter; and Stucki, Peter, 3,647,949.
Closs, Felix H., 3,647,977.
Dahms, Harald; and Hunziker, Heinrich E., 3,648,281.
Davis, William H.; Hornung, Louis M.; Lindsey, Royce D.; and Tanner, Howard C., 3,647,041.
Faure, Louis H.; and Hardart, Alfred T., 3,647,334.
Frey, Alexander H., Jr.; Schlosburg, Burton E.; and Tygielski, Ralph E., 3,648,237.
Goldsberry, Paul E., 3,648,249.
Haines, Robert Samuel, 3,647,540.
Harper, Leonard Roy, 3,648,072.
Herd, Harold H.; and Sun, Theresa I., 3,647,456.
Hoffman, Wililiam K., 3,648,065.
Hoffman, William K.; and Sumilas, John W., 3,648,063.
Howard, Webster E., Jr.; Ludeke, Rudolf; and Stiles, Phillip J., 3,648,124.
Kobayashi, Hisashi; and Tang, Donald T., 3,648,265.
Langendorf, Matthew P.; and Ridings, Charles L., 3,647,985.
Lean, Eric G.; Sadagopan, Varadachari; and Tseng, Samuel C.-C., 3,648,081.
McConnell, Robert L.; and Simpson, Jack W., 3,648,271.
Mullery, Alvin P.; and Zurcher, Frank W., Jr., 3,648,253.
Putnam, David T.; and Tatum, William C., 3,647,582.
Queener, Carl A., 3,647,293.
Sierra, Hugh M., 3,648,038.
Srinivasan, Rangaswamy; and Hiraoka, Hiroyuki, 3,647,656.
Stuby, Kenneth P., 3,648,131.
Tang, Donald T., 3,647,964.
Terman, Lewis Madison, 3,648,066.
Zurla, Frank A., 3,648,246.

International Flavors & Fragrances Inc.: *See—*
Blumenthal, Jack H., 3,647,880.
Brodnitz, Michael H.; and Pascale, John V., 3,647,481.
Evers, William J.; Katz, Ira; Wilson, Richard A.; and Theimer, Ernst T., 3,647,792.
Hall, John B., 3,647,826.

International Harvester Company: *See—*
Fritz, Edward A., 3,646,735.

International Materials: *See—*
Newkirk, Marc S.; and Zulkowski, Peter, W., 3,646,924.

International Minerals and Chemical Corporation: *See—*
Schumacher, Joseph S., 3,646,987.

International Nickel Company, Inc., The: *See—*
Pargeter, John K.; and Diran, Loris M., 3,647,419.
Schneider, Friedrich August, 3,647,544.

International Plasma Corporation: *See—*
Beaudry, Harvey James; and Waidtlow, Robert M., 3,648,059.
Beaudry, Harvey James, 3,648,191.
Bersin, Richard L., 3,647,676.

International Research & Development Company Limited: *See—*
Macnab, Robert Beattie; Ross, John Sterry Hawley; and Wood, Michael Burke, 3,648,082.
Wilkin, Geoffrey Alan; McNab, Ian Roderick; and Appleton, Anthony Derek, 3,648,088.

International Rubber Industries, Inc.: *See—*
Schrantz, William J., Jr., 3,647,704.

International Salt Company: *See—*
De Wittie, H W.; Kirchstein, John A.; and Atit, Kishore M., 3,647,396.

International Siporex Aktiebolaget: *See—*
Godin, Stig Olof; and Larsson, Karl Robert, 3,646,643.

International Standard Electric Corporation: *See—*
Hill, David Roderic, 3,647,978.
King, George; Rayner, John lilliam Frederick; and Powell, Anthony Charles, 3,647,536.
Rolf, Helmut, 3,648,208.
Taysom, Patrick Arnold; Lewis, Brian Mark; and Kittel, Clive Francis, 3,646,810.
Weinerth, Hans, 3,647,580.

International Telephone and Telegraph Corporation: *See—*
Hershberg, David E., 3,648,178.
Himmel, Leon, 3,648,177.
Julinot, Helmut Dietmar, 3,648,220.
Mash, Derek Hubert, 3,647,581.
Sanders, Lon L., 3,648,285.

Inventa AG fur Forschung und Patentverwertung: *See—*
Ryffel, Kaspar; and Schneller, Heinz, 3,647,758.

Iomec, Incorporated: *See—*
Dryg, Charles J., 3,647,936.

Iozzelli, Adriano. Mixing machine for meats and sausages. 3,647,190, Cl. 259-104.

Irakura, Tsutomu; Kasuga, Kazuga; and Segawa, Mitsuru, to Kyorin Seiyaku Kabushiki Kaisha. Benzoylamino substituted 1-benzoylpiperidines. 3,647,805, Cl. 260-293.77

Irland, Max J.: *See—*
Harvey, James E.; Irland, Max J.; and Lindberg, Victor L.,3,647,285.

Irvington Forest Industries, Inc.: *See—*
Rowley, Daniel S., 3,647,063.

Isaksson, Karl G. Collapsible drilling tools and the like. 3,647,008, Cl. 175-18.

Isard, Arsene; and Weiss, Francis, to Ugine Kuhlmann. Oxa-polycyclic diols and process for preparing the same. 3,647,823, Cl. 260-347.8

Ische, Friedrich: *See—*
Spietschka, Ernst; and Ische, Friedrich,3,647,828.

Ise, Hideo, to Nippon Columbia Kabushikikaisha(Nippon Columbia Co., Ltd.). Disc record injection molding machine. 3,647,338, Cl. 425-244.

Ishida, Shinichi: *See—*
Nagamatsu, Kazuo; Yoshino, Masatsugu; Konno, Tsugio; and Ishida, Shinichi,3,647,743.

Ishigaki, Eiichi, to Ishigaki Kiko Co., Ltd. Filter press. 3,647,082, Cl. 210-225.

Ishigaki Kiko Co., Ltd.: *See—*
Ishigaki, Eiichi, 3,647,082.

Ishii, Teruji. Apparatus and method for automatic quantitative analysis of substances by slight enthalpimetric difference. 3,646,812, Cl. 73-190.

Ishizawa, Kazutomo; Nagata, Yasunori; Abe, Junnosuke; and Fukuoka, Akira, to Kanegafuchi Boseki Kabushiki Kaisha. Method for heating pressing plates of continuous flat press. 3,646,992, Cl. 165-1.

Itani, Takashi: *See—*
Sigiyama, Hiroshi; Ikeda, Takuo; and Itani, Takashi,3,647,827.

Ito, Ken; Kaminaka, Hiroshi; Kotera, Norio; Yamamoto, Shinji; Dohgane, Iwao; Shigehiro, Kosuke; Kuruma, Hiroshi; Chinuki, Takashi; Yoshitake, Hiroshi; Tanimoto, Kenji; Hasegawa, Shinichi; and Kobayasi, Nobuki, to Sumitomo Chemical Co., Ltd. Method of oxidizing a secondary alkyl-substituted toluene. 3,647,866, Cl. 260-524.

Ito, Shin; Kubo, Seitoku; and Mori, Takakazu, to Toyota Jidosha Kogyo Kabushiki Kaisha. Shift control system for vehicle automatic transmission. 3,646,835, Cl. 74-860.

Itoh, Hirotoshi: *See—*
Matsuzawa, Hideo; Itoh, Hirotoshi; and Yoshioka, Teruhiko,3,647,640.

Iwamoto, Takeaki: *See—*
Seko, Maomi; Takahashi, Yasunobu; Iwamoto, Takeaki; and Seno, Shikazo,3,647,855.

Iwasawa, Yoshio: *See—*
Watanabe, Toshio; Tsukamoto, Goro; Hayashi, Kimiaki; Sato, Masanori; and Iwasawa, Yoshio,3,647,799.

Iwatsu Electric Co., Ltd.: *See—*
Nakaya, Naohisa, 3,648,068.
Nakaya, Naohisa, 3,648,080.

Izubayashi, Masuji: *See—*
Imai, Masaya; Izubayashi, Masuji; Takiyama, Keiichi; Hirai, Mitsuo; and Nikki, Masao,3,647,904.

Izuo, Ryuji: *See—*
Mizutani, Yukio; Yamane, Reiichi; Sata, Toshikatsu; and Izuo, Ryuji,3,647,086.

Jackson, Larry L., to Dow Chemical Company, The. Recovery of 1,2,4,5-tetrachlorobenzene and heat transfer agents. 3,647,894, Cl. 260-650.

Jackson, Roland S.: *See—*
Benson, Sidney W.; Haugen, Gilbert R.; and Jackson, Roland S.,3,647,387.

Jackson, William E., to Goodyear Tire & Rubber Company, The. Method for improving the adhesion of polyester compositions. 3,647,513, Cl. 117-47.

Jackson, William J. Unloader for storage bins. 3,647,094, Cl. 214-17.

Jacobs, Herbert V.: *See—*
Jacobs, Herbert V.; and Winston, Eric, 3,647,202.

Jacobs, Herbert V.; and Winston, Eric, to Jacobs, Herbert V., mesne. Ply shifter assembly. 3,647,202, Cl. 271-19.

Jacobs, James W., to General Motors Corporation. Thermochromic light flashing system. 3,648,280, Cl. 340-366.

Jacobson, Arthur F.; and Jacobson, Harold D. Safety glasses case with ID card holder and pencil carrying pocket protector. 3,647,056, Cl. 206-5.

Jacobson, Harold D.: *See—*
Jacobson, Arthur F.; and Jacobson, Harold D.,3,647,056.

Jacoby, Ian H.; Giordano, Anthony J.; and Fioretti, Warren H., to Identimation Corporation. Personnel identification apparatus. 3,648,240, Cl. 340-146.3

Jaeger, Walter, to Ovitron Corporation. Process for the production of sulfur trioxide by the cold gas process. 3,647,360, Cl. 23-168.

Jaggers, Brian George: *See—*
Curtis, Anthony John; Jaggers, Brian George; and Janes, John Francis,3,647,847.

Jaggers, Henry T.: *See—*
Hart, Dwight L.; Jaggers, Henry T.; and Walker, Charles S.,3,648,035.

James, Crafton D.: *See—*
Russell, Carl D., 3,646,630.

James, Mary Lea: *See—*
Russell, Carl D., 3,646,630.

James, Peter; Brennan, Martin J.; and Kappes, Ben E., said Brennan and Kappes assors. to said Peter, James. Computer system utilizing a telephone as an input device. 3,647,973, Cl. 179-2.

Jamieson, Ernest J.: *See—*
Swanson, John W.; Hartman, David A.; Beers, Russel L.; and Jamieson, Ernest J.,3,647,694.

Janc, Zbynek: *See—*
Kadera, Vaclav; Novotny, Josef; Vondruska, Miloslav; Feierfeil, Jiri; Svoboda, Vlastimil; Misarek, Dusan; Futera, Miroslav; Nacovska, Katerina; Janc, Zbynek; Nemec, Adolf; Penkava, Jiri; and Vitkovec, Zdenek,3,647,312.

Janes, John Francis: *See—*
Curtis, Anthony John; Jaggers, Brian George; and Janes, John Francis,3,647,847.

Janisch, Douglas G., to Tecumseh Products Company. Ignition circuit. 3,646,667, Cl. 29-593.

Janosi, Francis L., to Ford Motor Company. Variable ratio brake pedal. 3,646,831, Cl. 74-518.

Janssen, Willi: *See—*
Wetzel, Rolf Emil; and Janssen, Willi,3,647,417.

Jap S.A.: *See—*
Richard, Pierre, 3,646,653.

Japan Atomic Energy Research Institute: *See—*
Takehisa, Masaaki; Kawakami, Waichiro; Nakajima, Hayato; and Hosaki, Yoshihiko, 3,646,950.

Japan Gas-Chemical Company, Inc.: *See—*
Tsuboi, Yukio; Ueda, Yoshio; Ota, Tazuo; and Yoneoka, Mikio, 3,647,054.

Japan Metals and Chemicals Company Limited: *See—*
Tanabe, Isao, 3,647,375.

Japanese National Railways: *See—*
Murato, Kenichi; Takei, Kenji; and Takayama, Masayuki, 3,646,891.

Jaseph, Lawrence Flower, to Dover Corporation. Safety system for hydraulic elevators. 3,647,027, Cl. 187-73.

Jaun, Rudolph: *See—*
Bulat, John Ivan; and Jaun, Rudolph,3,647,092.

Jawor, Ronald W.: *See—*
Wollney, John L.; Jawor, Ronald W.; and Sanders, Norman L.,3,646,680.

Jefferson, Robert T.: *See—*
Salyer, Ival O.; and Jefferson, Robert T.,3,647,721.

Jeffreys, Lyman W., to Armsted Industries Incorporated. Top block shift. 3,646,991, Cl. 164-342.

Jenkins, Chester W. Time operated sequential dumping animal feeder. 3,646,913, Cl. 119-51.13

Jenner, Myron. Weather seal for building structures. 3,646,716, Cl. 52-403.

Jennings, George H. Fish alarm. 3,646,697, Cl. 43-17.

Jennings, Thomas Charles, to Lubrizol Corporation, The. Sealing compositions containing phosphorus- and metal-containing anti-sag agents. 3,647,745, Cl. 260-41.

Jensen, Harold A.: *See—*
Barnett, Allen M.; Jensen, Harold A.; and Meikleham, Virginia F.,3,647,578.

Jessep, Donald C., Jr.: *See—*
Carter, William C.; Duke, Keith A.; and Jessep, Donald C., Jr.,3,648,239.

Jidling, Kjell Esbjorn; and Soderkvist, Lars O. A., to LKB-Produkter AB. Injection and dosing arrangements. 3,646,960, Cl. 137-565.

Joh. Vaillant KG: *See—*
Meier, Hans, 3,647,136.

Johne, Hans: *See—*
Schone, Helmut; Weisbach, Gunter; Johne, Hans; Kuhn, Fritz; and Lein, Werner,3,647,205.

Johns, Herman S., to Wellman Industries, Inc. Textile coiler with cooperating drive means and silver can locating means. 3,646,640, Cl. 19-159.

Johns-Manville Corporation: *See—*
Pintard, Frederick Bruce; and Mollick, George Michael, 3,647,247.

Johnson & Johnson: *See—*
Ashcraft, Charles Ray, 3,647,507.

Johnson, Arthur L.: *See—*
Goldman, Martin; and Johnson, Arthur L.,3,647,429.

Johnson, Billie J. Method and means for making a carbon pattern on a flexible printing plate. 3,646,884, Cl. 101-33.

Johnson, David W.: *See—*
Corley, Lawrence G.; and Johnson, David W.,3,648,142.

Johnson, Dennis E.; Woodland, Lawrence R.; Kensler, Charles J.; and Himmelfarb, Philip, to Little, Arthur D., Inc. Apparatus for cell culture. 3,647,632, Cl. 195-142.

Johnson, Frederick S., 3/4 to Consolidated Concrete Limited. Concrete pump. 3,647,325, Cl. 417-508.

Johnson, Glenn J. Recirculating portable shower for campers, trailers or automobiles. 3,646,618, Cl. 4-147.

Johnson, James H.; and McGuire, William C., to Select Systems, Inc. Liquor dispensing system. 3,647,118, Cl. 222-145.

Johnson, Richard T., to Stein, Sam, Associates, Inc. Breading machine. 3,647,189, Cl. 259-45.

Johnson, S. C., & Son, Inc.: *See—*
Samuelson, Leon C., 3,647,119.

Jones, Arthur L.; and Benslay, Roger M., to Standard Oil Company, The, (Ohio). Dehydrogenation of hydrocarbons employing a catalyst of iron oxide containing activated carbon. 3,647,910, Cl. 260-683.3

Jones, Daniel F.: *See—*
Falk, George L.; and Jones, Daniel F.,3,646,773.

Jones, Ernest W.: *See—*
Fisher, Robert D.; and Jones, Ernest W.,3,648,259.

Jones, John F.: *See—*
Lubowitz, Hyman R.; Kendrick, William P.; Jones, John F.; Thorpe, Richard S.; and Burns, Eugene A.,3,647,529.

Jones, John Michael: *See—*
Benjamin, John; and Jones, John Michael,3,648,288.

Jones, Kenneth Morgan: *See—*
Head, Gordon Edwin; Jones, Kenneth Morgan; and Gendle, Eric,3,647,362.
Jones, Lee S.: *See—*
Hasten, Mark; Jones, Lee S.; and Pommer, Denis L.,3,646,894.
Jones, Marvin R., to Cameron Iron Works, Inc. Remotely located apparatus for producing well fluids. 3,646,962, Cl. 137-594.
Jones, Robert S. Grinding machinery and methods. 3,646,708, Cl. 51-5.
Jorgensen, George N., to Square D Company. Weatherproof bus duct joint structure having selectively removable parts. 3,647,937, Cl. 174-88.
Jorgenson, Julian B. Winding device for fish line. 3,647,155, Cl. 242-106.
Josey, Alden Dwayne, to Du Pont de Nemours, E. I., and Company. Sulfinyl ylids. 3,647,856, Cl. 260-465.
Joslin, Frederick R., to United Aircraft Corporation. Electrode for small hole electro-chemical drilling. 3,647,674, Cl. 204-284.
Julinot, Helmut Dietmar, to International Telephone and Telegraph Corporation. Electrical connector. 3,648,220, Cl. 339-17.
Junga, Yan Petrovich: *See—*
Berzin, Gunard Valdemarovich; Kalnin, Arvid Yanovich; Sushkov, Alexandr Fedorovich; Skrupsky, Voldemar Petrovich; Ziemelis, Andris Eduardovich; Soloviev, Boris Fedorovich; Leeniex, Karl Mikhailovich; Sovetin, Vladimir Kirilovich; Gulbis, Yan Karlovich; Dalbinsh, Yan Yanovich; Priede, Bruno Andreevich; Upman, Karl Kristapovich; Muzhits, Vitold Iosifovich; Junga, Yan Petrovich; Krogzem, Ivar Arnoldovich; Greitan, Zigurd Boleslavovich; and Rotsen, Karl Arturovich,3,646,687.
Jungner Instrument Aktiebolag: *See—*
Lindblad, Lars Alfred; and Kahlbom, Nils Rune, 3,647,668.
Juroff, Lyle Bruce; and Lunn, Lawrence Mark, to RCA Corporation. Remote controlled television tuner motor switching circuit. 3,648,135, Cl. 318-101.
Jutzu, Louis: *See—*
Keller, Ernest, 3,646,878.
Kaasenbrood, Petrus J. C.; and Taks, Gerardus J. J. M., to Stamicarbon N.V. Preparation of urea in combination with the synthesis of ammonia. 3,647,872, Cl. 260-555.
Kabel- und Metallwerke Gutehoffnungshutte Aktiengesellschaft: *See—*
Kuypers, Hubert, 3,646,972.
Kabel-und Metalwerke Gutehoffnungshutte Aktiengesellschaft: *See—*
Kipp, Adolf; and Payk, Heinz, 3,646,799.
Kabuki, Kimiaki; and Murai, Bunjiro, to Tokyo Shibaura Electric Co., Ltd. Method for rendering a synthetic resinous material antistatic. 3,647,727, Cl. 206-18.
Kabushiki Kaisha Hattori Tokeiten: *See—*
Kitai, Kiyoshi, 3,646,860.
Kabushiki Kaisha Koparu: *See—*
Arai, Kiyoyuki, 3,646,869.
Okada, Takaaki, 3,648,103.
Kabushiki Kaisha Suwa Seikosha: *See—*
Yamamura, Katsumi; and Kasai, Masami, 3,647,576.
Yamaoka, Goichi, 3,646,673.
Kabushiki-Kaisha Tokai Denki Seisakushe: *See—*
Suzuki, Masaru, 3,648,101.
Kabushikikaisha Copal: *See—*
Sato, Takayoshi, 3,648,053.
Kacmarcy, Charles W. Roof bolting method and assembly. 3,647,262, Cl. 299-11.
Kadera, Vaclav; Novotny, Josef; Vondruska, Miloslav; Feierfeil, Jiri; Svoboda, Vlastimil; Misarek, Dusan; Futera, Miroslav; Nacovska, Katerina; Janc, Zbynek; Nemec, Adolf; Penkava, Jiri; and Vitkovec, Zdenek, to CKD Praha, oborovy podnik. Mounting of stator blades in axial compressors. 3,647,312, Cl. 415-149.
Kadow, Hermann, to Siemens Aktiengesellschaft. Memory arrangement. 3,648,262, Cl. 340-174.
Kahlbom, Nils Rune: *See—*
Lindblad, Lars Alfred; and Kahlbom, Nils Rune,3,647,668.
Kahn, Leonard R., to Kahn Research Laboratories, Inc. Amplification system. 3,648,186, Cl. 330-10.
Kahn Research Laboratories, Inc.: *See—*
Kahn, Leonard R., 3,648,186.
Kaiser, Wolfgang: *See—*
Nitzsche, Siegfried; Kaiser, Wolfgang; Wohlfarth, Ernst; and Hittmair, Paul,3,647,725.
Kajita, Takao: *See—*
Koizumi, Takao; and Kajita, Takao,3,646,646.
Kalis, Horst, to U.S. Philips Corporation. Arrangement for frequency-analogous speed control of an induction machine fed through an inverter. 3,648,138, Cl. 318-231.
Kallenbach, Ralph M. Bulldozer blade load equalizer. 3,647,006, Cl. 172-803.
Kalnin, Arvid Yanovich: *See—*
Berzin, Gunard Valdemarovich; Kalnin, Arvid Yanovich; Sushkov, Alexandr Fedorovich; Skrupsky, Voldemar Petrovich; Ziemelis, Andris Eduardovich; Soloviev, Boris Fedorovich; Leeniex, Karl Mikhailovich; Sovetin, Vladimir Kirilovich; Gulbis, Yan Karlovich; Dalbinsh, Yan Yanovich; Priede, Bruno Andreevich; Upman, Karl Kristapovich; Muzhits, Vitold Iosifovich; Junga, Yan Petrovich; Krogzem, Ivar Arnoldovich; Greitan, Zigurd Boleslavovich; and Rotsen, Karl Arturovich,3,646,687.
Kaloff, Hans K., to Henkel & Cie GmbH. Novel perhydrates of tri-alkali metal citrates. 3,647,869, Cl. 260-535.
Kaltenbach & Voigt: *See—*
Saupe, Martin; and Farian, Gerhard, 3,646,677.
Kamal, Marwan R.; and Kuder, Robert C., to General Mills, Inc. Carbonates of ether and hydroxy substituted fatty amines. 3,647,852, Cl. 260-463.
Kamal, Marwan R.; and Kuder, Robert C., to General Mills, Inc. Carbonates of ether and hydroxy substituted fatty nitriles. 3,647,853, Cl. 260-463.
Kaminaka, Hiroshi: *See—*
Ito, Ken; Kaminaka, Hiroshi; Kotera, Norio; Yamamoto, Shinji; Dohgane, Iwao; Shigehiro, Kosuke; Kuruma, Hiroshi; Chinuki, Takashi; Yoshitake, Hiroshi; Tanimoto, Kenji; Hasegawa, Shinichi; and Kobayasi, Nobuki,3,647,866.
Kaminow, Ivan P., to Bell Telephone Laboratories, Incorporated. Induction heated optical guide. 3,647,277, Cl. 350-96.
Kamo, Takahiro: *See—*
Hasegawa, Nobuo; and Kamo, Takahiro,3,647,695.
Kampfer, David H., to Conveyor Specialties Company. Plastic encased metal ribbed flexible conveyor chain. 3,646,752, Cl. 59-78.
Kandler, Joachim: *See—*
Ahlgrim, Michael; Kandler, Joachim; Lenz, Hans-Joachim; Mietens, Gerhard; and Ott, Willy,3,647,514.
Kane, Hugh, to Honeywell Inc. Relay switch housing. 3,648,203, Cl. 335-132.
Kanegafuchi Boseki Kabushiki Kaisha: *See—*
Ishizawa, Kazutomo; Nagata, Yasunori; Abe, Junnosuke; and Fukuoka, Akira, 3,646,992.
Kappelman, Benjamin O.; and Myers, Charles T. Apparatus for forming rollers for producing a repetition of designs. 3,646,648, Cl. 29-76.
Kappes, Ben E.: *See—*
James, Peter; Brennan, Martin J.; and Kappes, Ben E.,3,647,973.
Kariya, Takashi: *See—*
Palopoli, Frank P.; Blohm, Thomas R.; and Kariya, Takashi,3,647,863.
Kasai, Masami: *See—*
Yamamura, Katsumi; and Kasai, Masami,3,647,576.
Kashiwa, Norio, to Mitsui Petrochemical Industries, Ltd. Process for polymerizing or copolymerizing olefins with carrier-supported catalyst. 3,647,772, Cl. 260-88.2
Kasuga, Kazuga: *See—*
Irakura, Tsutomu; Kasuga, Kazuga; and Segawa, Mitsuru,3,647,805.
Katagiri, Ken, to Shionogi & Co., Ltd. Method for producing triostin. 3,647,631, Cl. 195-80.
Katsumori, Teiji, to Tokico Limited. Vehicle suspension mechanism. 3,647,239, Cl. 280-124.
Katsuyama, Harumi: *See—*
Ono, Hisatake; Watarai, Syu; and Katsuyama, Harumi,3,647,428.
Katz, Ira: *See—*
Evers, William J.; Katz, Ira; Wilson, Richard A.; and Theimer, Ernst T.,3,647,792.
Kaucuk, narodni podnik: *See—*
Mysik, Stanislav; and Trneny, Jaromir, 3,647,723.
Kauder, Otto S., to Argus Chemical Corporation. Nickel organophosphites. 3,647,841, Cl. 260-439.
Kaupin, William B., to Ludlow Corporation. Nonwoven cotton bale cover. 3,647,061, Cl. 206-83.5
Kawakami, Waichiro: *See—*
Takehisa, Masaaki; Kawakami, Waichiro; Nakajima, Hayato; and Hosaki, Yoshihiko,3,646,950.
Kawamura, Takao: *See—*
Takemoto, Takeo; Miyata, Yoshihiko; and Kawamura, Takao,3,647,960.
Kawasumi, Shohachi: *See—*
Nakaguchi, Kohei; Kawasumi, Shohachi; Hirooka, Masaaki; Yabuuchi, Hiroshi; and Takao, Hiroyoshi,3,647,753.
Kawasumi, Shohanchi: *See—*
Nakaguchi, Kohei; Kawasumi, Shohanchi; Hirooka, Masaaki; and Yabuuchi, Hiroshi,3,647,771.
Kawato, Tomoyoshi; Kusakabe, Takashi; and Ono, Toshiyuki, to Nippon Kokan Kabushiki Kaisha. Method of making tapered poles. 3,648,008, Cl. 219-67.
Kay, Edward Leo; Hunt, Jerry Donald; and Spitz, Robert Paul, to Firestone Tire & Rubber Company, The. Stabilized conjugated diene rubber polymers. 3,647,739, Cl. 260-33.6
KDI-Bauer Corporation: *See—*
Bauer, Russell E., 3,646,645.
Kearley, Robert A., to PPG Industries, Inc. Separation of potassium phosphate and alumina. 3,647,370, Cl. 23-107.
Keating, Richard T. Filter for deep fryer. 3,646,882, Cl. 99-408.
Keck, Dieter, to Keller, C., Und Co. Apparatus for the removal of clay web wastes in a clay-shaping machine. 3,646,842, Cl. 83-104.
Keeslar, Clifford R., to Upjohn Company, The. Set-up tray. 3,647,105, Cl. 220-23.4
Kegelman, Matthew Roland, to Du Pont de Nemours, E. I., and Company. Hollow gas permeable fiber vented sealed galvanic cells. 3,647,557, Cl. 136-177.
Keim, Wilhelm: *See—*
Bauer, Ronald S.; Glockner, Peter W.; Keim, Wilhelm; and Mason, Ronald F.,3,647,915.
Glockner, Peter W.; Keim, Wilhelm; and Mason, Ronald F.,3,647,914.
Keiser, John E.; and Krieger, Earl, to Whirlpool Corporation. Method of producing porcelain enamel coatings. 3,647,509, Cl. 117-45.

Keller, C., Und Co.: *See—*
Keck, Dieter, 3,646,842.

Keller, Carol K.; Royka, Stephen F.; and Snelling, Christopher, to Xerox Corporation. Photoelectrophoretic imaging process wherein the imaging electrical field is applied subsequent to imagewise exposure. 3,647,659, Cl. 204-181.

Keller, Ernest, to Jutzu, Louis. Apparatus for barbecuing food. 3,646,878, Cl. 99-339.

Kellerman, David. Wound resistor arrangement. 3,648,218, Cl. 338-160.

Kelley Company, Inc.: *See—*
Potter, Roderick B., 3,646,627.

Kelly, Eugene W.: *See—*
Glover, William T.; and Kelly, Eugene W.,3,647,972.

Kelly, Jack L.; and Wiandt, Ronald K., to General Electric Company. Orientation independent phonograph. 3,647,222, Cl. 274-1.

Kelly, Joe T., deceased; and Kelly, Laverne S.; executrix. Hydrocarbon sweetening with H_2S-containing micellar dispersions. 3,647,683, Cl. 208-196.

Kelly, John B. Alarm signal apparatus to indicate damage to the insulation of an electrical cable as it is being laid underground. 3,648,282, Cl. 340-421.

Kelly, Laverne S.: *See—*
Kelly, Joe T., deceased; and Kelly, Laverne S.; executrix,3,647,683.

Kelsey-Hayes Company: *See—*
Scharlack, Ronald S., 3,647,267.

Kelso, John W., to United States Steel Corporation. Apparatus for finishing die niba. 3,647,669, Cl. 204-212.

Kemp Applications Limited: *See—*
Kemp, Jack Voyna Leslie, 3,647,201.

Kemp, Jack Voyna Leslie, to Kemp Applications Limited. Machines for folding paper and other sheets. 3,647,201, Cl. 270-73.

Kemp, Norman H. Closure for pressure vessels. 3,647,108, Cl. 220-46.

Kemp, Sidney D.: *See—*
Vanderhurst, William L.; and Kemp, Sidney D.,3,647,184.

Kendall, Giles A.: *See—*
Bhutani, Harish K.; and Kendall, Giles A.,3,647,199.

Kendrick, William P.: *See—*
Lubowitz, Hyman R.; Kendrick, William P.; Jones, John F.; Thorpe, Richard S.; and Burns, Eugene A.,3,647,529.

Kennametal Inc.: *See—*
Kosker, Leon G., 3,647,307.
Oaks, Seibert S.; and Kita, John F., 3,646,649.

Kennedy, James: *See—*
Clark, John Colin; Cowley, Brian Richard; Gregory, Gordon Ian; Kennedy, James; and Long, Alan Gibson,3,647,788.

Kensler, Charles J.: *See—*
Johnson, Dennis E.; Woodland, Lawrence R.; Kensler, Charles J.; and Himmelfarb, Philip,3,647,632.

Keough, Allen H.: *See—*
Clough, Philip J.; and Keough, Allen H.,3,646,749.

Kernick, Andress; Geyer, Manvel A.; and Ernsberger, Glenn W., to Westinghouse Electric Corporation. Apparatus for producing a low distortion pulse width modulated inverter output. 3,648,150, Cl. 321-9.

Kerr-McGee Corporation: *See—*
Lucid, Michael F., 3,647,712.

Kerwin, Robert E., to Bell Telephone Laboratories, Incorporated. Technique for recording and testing the registration of sequential mask sets. 3,647,457, Cl. 96-41.

Keshin, Jesse G. Prosthesis for implanting around a body duct such as the urethra and method of treating urinary incontinence. 3,646,616, Cl. 3-1.

Keyes, Frederick G. Breath analyzing apparatus having means for evaporating moisture from breath conduit. 3,647,391, Cl. 23-254.

Keys Fibre Company: *See—*
Crabtree, Kenneth L., 3,647,132.

Keystone Consolidated Industries, Inc.: *See—*
Meinhardt, James R., 3,646,633.

Keyworth, Donald A.: *See—*
Walker, David G.; and Keyworth, Donald A.,3,647,843.

Kiddie World Toys, Ltd.: *See—*
Nicholoson, Iver Val, 3,646,705.

Kiely, Robert R., to Mobil Oil Corporation. Roll of double pocketed bag structures. 3,647,060, Cl. 206-58.

Kikkoman Shoyu Co., Ltd.: *See—*
Yokotsuka, Tamotsu; Aonuma, Tatsuo; Mogi, Koya; Fukushima, Danji; Yasuda, Atsushi; Watanabe, Hiroharu; Tsukada, Naoshi; and Arai, Akira, 3,647,484.

Kim, Keun Young; and Shaver, Kenneth J., to Monsanto Company. Method for preparation of dicalcium phosphate. 3,647,371, Cl. 23-108.

Kim, Man Jin, to General Electric Company. Complementary MIS-FET devices and method of fabrication. 3,646,665, Cl. 29-571.

Kim, Yung Ki: *See—*
Loree, Lorne A.; Pierce, Ogden R.; and Kim, Yung Ki,3,647,740.

Kimura, Katsuo: *See—*
Tanaka, Eihachiro; Fukuda, Takeji; Yamaji, Kenkichi; Miyake, Yasuhiko; Ota, Hiroshi; and Kimura, Katsuo,3,646,796.

Kindig, James K.: *See—*
Coltrinari, Enzo L.; and Kindig, James K.,3,647,361.

Kindo, Hideaki: *See—*
Mukai, Hisakazu; Kindo, Hideaki; Sugahara, Yoshimasa; and Yamagata, Akinori,3,648,064.

King, George G.: *See—*
Bufton, Richard G.; Semancik, John R.; and King, George G.,3,647,769.

King, George; Rayner, John Iilliam Frederick; and Powell, Anthony Charles, to International Standard Electric Corporation. Ohmic contacts for GaAs. 3,647,536, Cl. 117-227.

King, James R.: *See—*
Haist, Grant M.; King, James R.; and Pupo, David A.,3,647,453.

King, Ted R., Jr.: *See—*
Fabiano, Lucian Philip, Jr.; Grandmaison, John Paul; Greason, William Wallace, III; and King, Ted R., Jr.,3,647,980.

King-Seeley Thermos Co.: *See—*
Clough, Philip J.; and Keough, Allen H., 3,646,749.
Gorrell, John H., 3,647,508.

Kingsberry Home Corporation: *See—*
Groat, Marshall O., 3,646,714.

Kipp, Adolf; and Payk, Heinz, to Kabel-und Metalwerke Gutehoffnungshutte Aktiengesellschaft. Method of making molds for continuous casting machines. 3,646,799, Cl. 72-370.

Kirberg, James R.: *See—*
Leising, Maurice B.; Greif, Herman J., Jr.; Kirberg, James R.; and Willson, Philip J.,3,647,393.

Kirchner, Freddrick K., to Sterling Drug Inc. Indazolylphenylureas and indazolylphenylthioureas. 3,647,819, Cl. 260-310.

Kirchstein, John A.: *See—*
De Wittie, H W.; Kirchstein, John A.; and Atit, Kishore M.,3,647,396.

Kirk, Merritt C., Jr.; and Dobson, Ernest W., to Sun Oil Company. Process for reforming heavy naphtha. 3,647,679, Cl. 208-63.

Kirschbaum, Michael E.: *See—*
Geisler, Raymond E.; Hull, Leroy E.; and Kirschbaum, Michael E.,3,647,974.

Kise, Mearl A.; and Ellis, Leonard C., to Virginia Chemicals, Inc.Process in the preparation of N,N-di-n-propyl-α- chloroacetamide. 3,647,876, Cl. 260-561.

Kiser, Herbert H.: *See—*
Marchetti, John W.; and Kiser, Herbert H.,3,648,189.

Kishimoto, Takuo: *See—*
Suzuki, Yasuhiro; Ikegami, Renpei; and Kishimoto, Takuo,3,647,090.

Kita, John F.: *See—*
Oaks, Seibert S.; and Kita, John F.,3,646,649.

Kitai, Kiyoshi, to Kabushiki Kaisha Hattori Tokeiten. Camera with automatically charged shutter. 3,646,860, Cl. 95-10.

Kitajima, Nobuo: *See—*
Hanada, Hiroshi; and Kitajima, Nobuo,3,647,430.
Hanada, Hiroshi; Kitajima, Nobuo; and Masaki, Tatsuo,3,647,427.

Kitamura, Hiroyuki, to Tokyo Shibaura Electric Co., Ltd. Electromagnetic braking device. 3,648,087, Cl. 310-93.

Kitamura, Kosuke: *See—*
Ikegami, Kazutoshi; Ikeda, Hideo; Takeuchi, Kazumi; Kitamura, Kosuke; and Takahashi, Susumu,3,648,179.

Kitani, Hiroshi: *See—*
Nakahara, Tsuneo; Kurauchi, Noritaka; and Kitani, Hiroshi,3,648,172.

Kittel, Clive Francis: *See—*
Taysom, Patrick Arnold; Lewis, Brian Mark; and Kittel, Clive Francis,3,646,810.

Kittredge, Thomas D.: *See—*
Pressman, Gerald L.; and Kittredge, Thomas D.,3,647,291.

Klann, Horst, to Huppe, Justin, Kommanditgesellschaft. Venetian blind with automatic control of room brightness. 3,646,985, Cl. 160-168.

Klee, Gerhard, to Samson-Apparatebau A.G. Duct system for fluid pressure medium operated regulating, control and measuring apparatus. 3,646,963, Cl. 137-608.

Kleimann, Helmut: *See—*
Marquarding, Dieter; Ugi, Ivar V.; Kleimann, Helmut; and Hoffmann, Peter,3,647,775.

Klein, Bruce W., to Bendix Corporation, The. Secondary shoe brake lining. 3,647,033, Cl. 188-251.

Klein, Georg Anton: *See—*
Carr, Albert A.; Meyer, Donald R.; Carr, Albert A.; Meyer, Donald R.; and Klein, Georg Anton,3,647,797.

Klein, Georg Anton, to Ciba-Geigy AG. Pigments of the perylene tetracarboxylic acid diimide series. 3,647,798, Cl. 260-281.

Klein, Gerald: *See—*
Goldie, Harry; Goldman, Michael A.; and Klein, Gerald,3,648,100.

Klein, Keith W., to General Electric Company. Viscous damped pivot system for a phonograph tone arm. 3,647,224, Cl. 274-23.

Klein, Norman E., to Deering Milliken Research Corporation. Apparatus for the production of non-woven materials. 3,646,647, Cl. 28-1.

Klein, Richard Ira; and Caplan, Sandor, to RCA Corporation. Liquid crystal display device. 3,647,280, Cl. 350-160.

Kletschka, Harold D.: *See—*
Rafferty, Edson Howard; and Kletschka, Harold D.,3,647,324.

Knapsack Aktiengesellschaft: *See—*
Ahlgrim, Michael; Kandler, Joachim; Lenz, Hans-Joachim; Mietens, Gerhard; and Ott, Willy, 3,647,514.
Sennewald, Kurt; Hauser, Alfred; and Lork, Winfried, 3,647,867.

Knight, Bobbie D.: *See—*
Doty, Warren R.; and Knight, Bobbie D.,3,647,699.

Knight, Stephen,, to Bell Telephone Laboratories, Incorporated. Circuit protection apparatus utilizing optical transmission path. 3,648,110, Cl. 317-16.

Knutson, Lloyd E. Cucumber picker. 3,646,742, Cl. 56-327.

Kobayashi, Hisashi; and Tang, Donald T., to International Business Machines Corporation. Magnetic data storage system with interleaved NRZI coding. 3,648,265, Cl. 340-174.1

Kobayashi, Isamu, to Sony Corporation. Integrated complementary transistor circuit chip with polycrystalline contact to buried collector regions. 3,648,128, Cl. 317-235.

Kobayashi, Takanori: *See—*
Oke, Syoichi; and Kobayashi, Takanori,3,647,039.

Kobayashi, Takehiko: *See—*
Suenaga, Masanobu; Machii, Tetsuo; Sawano, Takahiro; Kobayashi, Takehiko; Dengo, Tadao; and Nakai, Tetsuzo,3,648,121.

Kobayasi, Nobuki: *See—*
Ito, Ken; Kaminaka, Hiroshi; Kotera, Norio; Yamamoto, Shinji; Dohgane, Iwao; Shigehiro, Kosuke; Kuruma, Hiroshi; Chinuki, Takashi; Yoshitake, Hiroshi; Tanimoto, Kenji; Hasegawa, Shinichi; and Kobayasi, Nobuki,3,647,866.

Kober, Frederick P.; and West, Hiry B., to Yardney International Corporation. Disposable electrochemical cells and method of operating same. 3,647,550, Cl. 136-86.

Kobetz, Paul: *See—*
Ashby, Eugene C.; and Kobetz, Paul,3,647,399.

Kobler, Robert James, to AMP Incorporated. Electrical housing member. 3,648,213, Cl. 339-217.

Koch, Werner G.; Marchell, Robert H.; and Redmond, William G., to LTV Electrosystems, Inc. Motor operated servo-pump. 3,646,754, Cl. 60-52.

Koches, Charles F., to Westvaco Corporation. Transport reactor with a venturi/tube connection to a combustion chamber for producing activated carbon. 3,647,716, Cl. 252-445.

Koenig, Francis L. Navigational computer and plotting device. 3,646,681, Cl. 33-1.

Koff, Bernard L., to General Electric Company. Gas turbine engines with compressor rotor cooling. 3,647,313, Cl. 415-115.

Kohashi, Tadao: *See—*
Nakamura, Tadao; Nakamura, Shigeaki; and Kohashi, Tadao,3,648,052.

Kohl, Karl. Warp knitting machine for pile fabrics. 3,646,782, Cl. 66-87.

Kohn, Mitchell I.: *See—*
Alton, Ahdor H.; and Kohn, Mitchell I.,3,648,183.

Koishikawa, Yoshiyuki. Drum head. 3,647,931, Cl. 84-411.

Koizumi, Takao; and Kajita, Takao, to Teijin Limited. Apparatus for setting stitches of tubular knitted fabrics for deknitting. 3,646,646, Cl. 26-69.

Koleff, Boris; and Nagel, Erich, to Agfa-Gevaert Aktiengesellschaft. Device for braking of shutter blades or the like. 3,646,870, Cl. 95-59.

Koller, James E.: *See—*
Taber, Robert C.; and Koller, James E.,3,647,463.

Kolody, Stanley J. Scale pattern and route conversion marker. 3,646,885, Cl. 101-328.

Komarov, Nikolai Vasilievich; and Ermolova, Tatyana Ivanovna. Process for the production of tetraalkyl lead. 3,647,844, Cl. 260-437.

Komata, Yasushi: *See—*
Shimazaki, Hideo; Tsukamoto, Shuji; Saito, Tadaomi; Eguchi, Sadanari; and Komata, Yasushi,3,647,825.

Komatsu, Akitoshi: *See—*
Yano, Tomosaburo; Oishi, Naoaki; Komatsu, Akitoshi; and Koyama, Keizi,3,647,415.

Kondo, Eiroku; Usuda, Hirotaka; Suzuki, Hidemasa; and Furuya, Tuneo, to Hitachi, Ltd. Switching system having means for identifying locations of both incoming and outgoing trunk circuits. 3,647,981, Cl. 179-18.

Konig, Karl-Heinz; and Huntrup, Antonius, to Vissers, H., N.V., mesne. Free-cutting mowing machine. 3,646,732, Cl. 56-13.6

Konno, Tsugio: *See—*
Nagamatsu, Kazuo; Yoshino, Masatsugu; Konno, Tsugio; and Ishida, Shinichi,3,647,743.

Kontur Kontact Lens Company, Inc.: *See—*
Ewell, David G., 3,647,736.

Koo, Tuh-Kai. Opto-electronic data entry means having plurality of control means to direct part of radiation in channel from radiation source to output channel. 3,648,050, Cl. 250-208.

Koppers Company, Inc.: *See—*
Hartzell, Harry F., Jr., 3,647,049.
Helm, Edward J., 3,647,636.

Korbonits, Dezso: *See—*
Harsanyi, Kalman; Reiter, Jozsef; Korbonits, Dezso; Gonczi, Csaba; Takacs, Kalman; Bako, Erzsebet; Leszkovszky, Gyorgy; Tardos, Laszlo; and Vertesy, Csaba,3,647,809.

Korn, Tadeusz. Motional feedback amplifier. 3,647,969, Cl. 179-1.

Korshalla, Joseph Daniel: *See—*
McGahren, William James; Porter, John Norman; and Korshalla, Joseph Daniel,3,647,776.

Kosaka, Genzo: *See—*
Gomada, Nobuyasu; and Kosaka, Genzo,3,647,577.

Kosker, Leon G., to Kennametal Inc. Boring bar. 3,647,307, Cl. 408-181.

Kostin, Konstantin Fedorovich; Sapunov, Georgy Konstantinovich; Svirin, Alvian Afanasievich; Strakhov, Valery Ivanovich; and Shur, Grigory Iosifovich. Stator bar winding of electric machine. 3,648,091, Cl. 310-260.

Kotani, Hirotada: *See—*
Shoji, Osamu; Hironaka, Jouji; and Kotani, Hirotada,3,647,626.

Kotera, Norio: *See—*
Ito, Ken; Kaminaka, Hiroshi; Kotera, Norio; Yamamoto, Shinji; Dohgane, Iwao; Shigehiro, Kosuke; Kuruma, Hiroshi; Chinuki, Takashi; Yoshitake, Hiroshi; Tanimoto, Kenji; Hasegawa, Shinichi; and Kobayasi, Nobuki,3,647,866.

Koushuha-Netsuren Kabushiki Kaisha: *See—*
Amakasu, Tatuo; and Yamazaki, Takao, 3,648,006.

Kowalski, Daniel C., to Bendix Corporation, The. Optical correlator for automatic stereoplotting apparatus. 3,648,039, Cl. 235-181.

Koyama, Keizi: *See—*
Yano, Tomosaburo; Oishi, Naoaki; Komatsu, Akitoshi; and Koyama, Keizi,3,647,415.

Kozacka, Frederick J., to Chase-Shawmut Company, The. High-voltage fuse with self-supporting spring fuse link. 3,648,210, Cl. 337-161.

Krajewski, Werner; and Nahirny, John, to Syntron (Canada) Limited. Transduction, control and measurement of vibration in vibratory apparatus. 3,648,136, Cl. 318-128.

Krajmer, Anton: *See—*
Majek, Vladimir; Krajmer, Anton; and Smitmajer, Zdenek,3,648,140.

Kramer, Charles J., Jr., to Bendix Corporation, The. Ring laser having means for preventing mode locking. 3,647,303, Cl. 356-106.

Kramer, Walter R.: *See—*
Stenger, Vernon A.; and Kramer, Walter R.,3,647,261.

Krammer, Robert, to Leach, John M. Overhead conveyor trolley plates. 3,647,048, Cl. 198-177.

Krause, Erich, to Universal Maschinenfabrik Dr. Rudolf Schieber KG. Knitting machine with narrowing and widening mechanism. 3,646,783, Cl. 66-95.

Kreevoy, Maurice M.; Borch, Richard F.; and Hutchins, Jonathan E. C., to University of Minnesota, Regents of the. Method for reducing ketones. 3,647,890, Cl. 260-617.

Kregal, Jesse N. Kettle drum. 3,646,843, Cl. 84-419.

Kreisheimer, John P.: *See—*
Ravatt, Hugh M., 3,647,219.

Kreiskorte, Heinz A., to Moeller & Neumann G.m.b.H. Measuring devices for rolling mills. 3,646,686, Cl. 33-182.

Krieger, Earl: *See—*
Keiser, John E.; and Krieger, Earl,3,647,509.

Kritz, Jacob A.; and Lerner, Seymour D., to Sperry Rand Corporation. Digital sonar doppler navigator. 3,648,225, Cl. 340-3.

Krogzem, Ivar Arnoldovich: *See—*
Berzin, Gunard Valdemarovich; Kalnin, Arvid Yanovich; Sushkov, Alexandr Fedorovich; Skrupsky, Voldemar Petrovich; Ziemelis, Andris Eduardovich; Soloviev, Boris Fedorovich; Leeniex, Karl Mikhailovich; Sovetin, Vladimir Kirilovich; Gulbis, Yan Karlovich; Dalbinsh, Yan Yanovich; Priede, Bruno Andreevich; Upman, Karl Kristapovich; Muzhits, Vitold Iosifovich; Junga, Yan Petrovich; Krogzem, Ivar Arnoldovich; Greitan, Zigurd Boleslavovich; and Rotsen, Karl Arturovich,3,646,687.

Kruger, Gunther, to Steele Chemicals Company Limited. Process for the preparation of 3α-hydroxy-5*p* pregnan-20-one. 3,647,829, Cl. 260-397.4

Krul, Leendert Gerardus: *See—*
Van Overbeek, Adrianus Johannes Wilhelmus Marie; and Krul, Leendert Gerardus,3,647,957.

Kubo, Seitoku: *See—*
Ito, Shin; Kubo, Seitoku; and Mori, Takakazu,3,646,835.

Kubo, Seitoku; Ohnuma, Kiyoshi; and Hirosawa, Koichiro, to Toyota Jidosha Kogyo Kabushiki Kaisha. Hydraulic control system for automatic transmissions. 3,646,836, Cl. 74-864.

Kubodera, Toshiya; Hara, Tasuku; and Makabe, Hideki, to Shimadzu Seisakusho Ltd. Apparatus for synthesis of peptides or the like organic compounds. 3,647,390, Cl. 23-252.

Kuchenthal, Gunther; and Hentzschel, Wolfgang, to Werner & Pfleiderer. Continually operating fluidized bed dryer for drying loose material. 3,646,689, Cl. 34-182.

Kuder, Robert C.: *See—*
Kamal, Marwan R.; and Kuder, Robert C.,3,647,852.
Kamal, Marwan R.; and Kuder, Robert C.,3,647,853.

Kudlaty, Walter J.: *See—*
Niccum, Forest G.; Kudlaty, Walter J.; Dauer, Charles W.; and Heinrich, Peter, Jr.,3,647,083.

Kuhlthau, Hans-Peter: *See—*
Raue, Roderich; Eifler, Willi; and Kuhlthau, Hans-Peter,3,647,349.

Kuhn, Fritz: *See—*
Schone, Helmut; Weisbach, Gunter; Johne, Hans; Kuhn, Fritz; and Lein, Werner,3,647,205.

Kulling, Achim: *See—*
Hilgers, Giovanni; Hitzemann, Gerhard; and Kulling, Achim,3,647,377.

Kunstadt, George H. Data head actuation apparatus and circuit. 3,648,263, Cl. 340-174.1

Kunz, Werner: *See—*
Calzaferri, Hans; Kunz, Werner; Schwemmer, Martin W.; and Wyler, Max,3,647,353.

Kupsky, George A., to Burroughs Corporation. Display panel with novel cathode assembly. 3,648,093, Cl. 313-217.

Kurashiki Rayon Co., Ltd.: *See—*
Okaya, Takuji; and Miyazaki, Hirotoshi, 3,647,756.

Kuratomi, Tatsuo. Ultra high pressure-temperature apparatus. 3,647,331, Cl. 425-77.

Kurauchi, Noritaka: *See—*
Nakahara, Tsuneo; Kurauchi, Noritaka; and Kitani, Hiroshi,3,648,172.

Kuruma, Hiroshi: *See—*
Ito, Ken; Kaminaka, Hiroshi; Kotera, Norio; Yamamoto, Shinji; Dohgane, Iwao; Shigehiro, Kosuke; Kuruma, Hiroshi; Chinuki, Takashi; Yoshitake, Hiroshi; Tanimoto, Kenji; Hasegawa, Shinichi; and Kobayasi, Nobuki,3,647,866.

Kusakabe, Takashi: *See—*
Kawato, Tomoyoshi; Kusakabe, Takashi; and Ono, Toshiyuki,3,648,008.

Kuwabara, Takeo; Morimoto, Kazumi; and Miyao, Hachiro, to Tokyo Shibaura Electric Co., Ltd. Breaking resistor with cooling means. 3,648,212, Cl. 338-53.

Kuwazaki, Masahiro: *See—*
Watanabe, Jun; Hosoi, Susumu; Kuwazaki, Masahiro; Ota, Akira; Takata, Toshikatsu; and Asaoka, Junichi,3,647,552.

Kuypers, Hubert, to Kabel- und Metallwerke Gutehoffnungshutte Aktiengesellschaft. Multi-tubing system. 3,646,972, Cl. 138-111.

Kuznietz, Moshe; Lander, Gerard H.; and Baskin, Yehuda, to United States of America, Atomic Energy Commission. Cryogenic sensing device using uranium monophosphide-uranium monosulphide. 3,646,813, Cl. 73-359.

Kyorin Seiyaku Kabushiki Kaisha: *See—*
Irakura, Tsutomu; Kasuga, Kazuga; and Segawa, Mitsuru, 3,647,805.

Kyowa Gas Chemical Industry Co., Ltd.: *See—*
Nagai, Haruo; and Sugiyama, Naohisa, 3,647,729.

Kyowa Hakko Kogyo Co., Ltd.: *See—*
Nakayama, Kiyoshi, 3,647,628.
Tanaka, Masao; Nakamura, Nobuo; and Takasawa, Seigo, 3,647,627.

La Branche, Harvey W.: *See—*
Chang, Richard S.; Cutler, Stanley; La Branche, Harvey W.; Pearlman, Marshall B.; Ryan, John W.; and Toy, Raymond M.,3,647,927.

Lace, Melvin A.; and Repay, Laszlo N., to Motorola, Inc. Track indicator for a tape player. 3,647,986, Cl. 179-100.2

Ladany, Ivan, to RCA Corporation. Liquid phase double epitaxial process for manufacturing light emitting gallium phosphide devices. 3,647,579, Cl. 148-171.

Laedlein, Denis Jacques: *See—*
Manuali, Bertrand Claude Marcel Jean; Doullet, Robert; and Laedlein, Denis Jacques,3,648,114.

Laermer, Lothar: *See—*
Rathjen, J. Fred; and Laermer, Lothar,3,648,113.

Laessig, Rudolf R., to General Electric Compay. Centrifugal pump. 3,647,314, Cl. 415-206.

Lagos, Costas, to Sylvania Electric Products Inc. Phosphor and method of making. 3,647,706, Cl. 252-301.4

La Grutta, Pascal A., to Container Corporation of America. Cap for aerosol cans or the like. 3,647,107, Cl. 220-60.

L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude:*See—*
Monnier, Jean-Pierre, 3,646,933.

Laithwaite, Eric Roberts; and Bolton, Hugh Robert, to National Research Development Corporation. Linear induction motors. 3,648,084, Cl. 310-13.

Lakodey, Andre; and Weiss, Francis, to Ugine Kuhlmann. Biscyclopentadienylic compounds and process of preparing same. 3,647,897, Cl. 260-666.

La Lanne, Jack. Weight lifting type exercising device. 3,647,209, Cl. 272-58.

Lamb. Thomas J.: *See—*
Huska, Paul A.; Meissner, Herman P.; and Lamb. Thomas J.,3,647,373.

Lamort, Pierre. Apparatus for clarifying liquids contaminated by materials in suspension, more particularly waste water from paper machines. 3,647,071, Cl. 210-107.

Land, Edwin H., to Polaroid Corporation. Integral negative/positive color diffusion transfer process film unit employing in-situ generated visible light-reflecting agent. 3,647,434, Cl. 96-3.

Land, Edwin H., to Polaroid Corporation. Integral negative/positive color diffusion transfer process film unit employing in-situ generated visible light-reflecting agent. 3,647,435, Cl. 96-3.

Land, Edwin H., to Polaroid Corporation. Photographic products, processes and compositions. 3,647,437, Cl. 96-3.

Lander, Gerard H.: *See—*
Kuznietz, Moshe; Lander, Gerard H.; and Baskin, Yehuda,3,646,813.

Landis Tool Company: *See—*
Flohr, William P., Jr.; and Boller, John A., 3,646,710.

Landry, Caliste J.: *See—*
Elings, Virgil B.; and Landry, Caliste J.,3,647,284.

Lang, Frederic A. Tendons for prestressed concrete and process for making such tendons. 3,646,748, Cl. 57-149.

Lang, Gregor L. Alternating current solenoids. 3,647,177, Cl. 251-129.

Langas, Arthur: *See—*
Lingle, Harrison C.; and Langas, Arthur,3,647,593.

Lange, Fritz-Walter, to Schwarzkopf, Hans, GmbH. Pyridine dyestuff intermediates in a hair dyeing composition and method. 3,647,351, Cl. 8-10.2

Lange, Lawrence H.: *See—*
Potts, John T.; Lange, Lawrence H.; and Liss, Thomas P.,3,647,066.

Langendorf, Matthew P.; and Ridings, Charles L., to International Business Machines Corporation. Tone actuated dictation systems with voice buffer option. 3,647,985, Cl. 179-100.1

Langer, Arthur W., Jr., to Esso Research and Engineering Company. Preparation of linear olefin products. 3,647,912, Cl. 260-683.15

Langlois, Henry J., to American Standard Inc. Trapezoidial scoop tube. 3,646,756, Cl. 60-54.

Lanning, Charles T.; and Cook, James T. Removable flotation means and water drive assembly for snowmobiles. 3,646,904, Cl. 115-1.

Larralde, Edward: *See—*
Hanes, James W. E.; and Larralde, Edward,3,647,245.

Larson, Gary B., to MacDermid Incorporated. Colored phosphate coatings and method of application. 3,647,568, Cl. 148-6.15

Larsson, Karl Robert: *See—*
Godin, Stig Olof; and Larsson, Karl Robert,3,646,643.

Lasis, Evalds, to Polymer Corporaion Limited. Purification of olefins. 3,647,913, Cl. 260-681.5

Lauber, Ernst Abraham, to Atlas Copco Aktiebolag. Machine for driving tunnels, drifts, raises, and the like. 3,647,264, Cl. 299-31.

Lauber, Ernst Abraham; and Herron, Lorne Robert, to Atlas Copco Aktiebolag. Tunnelling machines and the like. 3,647,263, Cl. 299-31.

Laubie, Michel: *See—*
Regnier, Gilbert; Canevari, Roger; and Laubie, Michel,3,647,794.

Lavallee, Robert G., to American Optical Corporation. Oximeter. 3,647,299, Cl. 356-41.

Lavarenne, Jean, to Nord-Aviation Societe Nationale de Constructions Aeronautiques. Method of detection of the speed of a moving body in excess of a reference speed, and the corresponding apparatus. 3,648,267, Cl. 340-263.

Lawson, Graham John, to United Kingdom of Great Britain and Northern Ireland, Minister of Technology in Her Britannic Majesty's Government of the. Navigational apparatus. 3,648,034, Cl. 235-150.26

Layland, James W.: *See—*
United States of America,National Aeronautics and Space Administration, Administrator, 3,648,256.

Leach, John M.: *See—*
Krammer, Robert, 3,647,048.

Lean, Eric G.; Sadagopan, Varadachari; and Tseng, Samuel C.-C., to International Business Machines Corporation. Piezoelectric acoustic surface wave device utilizing an amorphous semiconductive sensing material. 3,648,081, Cl. 310-8.1

Lear Siegler, Inc.: *See—*
Fujii, Robert L., 3,648,085.

Lee, Daeyong, to General Electric Company. Process for producing articles with apertures or recesses of small cross-section and product produced thereby. 3,647,085, Cl. 210-500.

Lee, Richard J., to Standard Oil Company (Indiana). Nitrogen-containing reaction products and their use in lubricating oils and fuels. 3,647,692, Cl. 252-51.5

Lee, Sung Ki, to Hooker Chemical Corporation. Flexible curable heterochain polymers. 3,647,757, Cl. 260-72.5

Lee, Sung Ki, to Hooker Chemical Corporation. Flexible phenolic resins. 3,647,919, Cl. 260-842.

Leeds & Northrup Company: *See—*
Hance, Richard J.; Wiese, John R.; and Clauss, Harry G., Jr., 3,646,816.

Leeniex, Karl Mikhailovich: *See—*
Berzin, Gunard Valdemarovich; Kalnin, Arvid Yanovich; Sushkov, Alexandr Fedorovich; Skrupsky, Voldemar Petrovich; Ziemelis, Andris Eduardovich; Soloviev, Boris Fedorovich; Leeniex, Karl Mikhailovich; Sovetin, Vladimir Kirilovich; Gulbis, Yan Karlovich; Dalbinsh, Yan Yanovich; Priede, Bruno Andreevich; Upman, Karl Kristapovich; Muzhits, Vitold Iosifovich; Junga, Yan Petrovich; Krogzem, Ivar Arnoldovich; Greitan, Zigurd Boleslavovich; and Rotsen, Karl Arturovich,3,646,687.

Leete, Bernard D., to General Electric Company. Starting control scheme for rectifier-inverter system. 3,648,147, Cl. 321-2.

Leftheris, Basil P., to Grumman Aerospace Corporation. Method and apparatus for deforming a metal workpiece, upsetting rivets, and for blind riveting. 3,646,791, Cl. 72-56.

Lehde, Henry C.: *See—*
Burrows, Alan A.; and Lehde, Henry C.,3,648,229.

Leiga, Algird G., to Xerox Corporation. Uniform electrostatic charging of a photoconductive insulating surface. 3,648,133, Cl. 317-262.

Lein, Werner: *See—*
Schone, Helmut; Weisbach, Gunter; Johne, Hans; Kuhn, Fritz; and Lein, Werner,3,647,205.

Leising, Maurice B.; Greif, Herman J., Jr.; Kirberg, James R.; and Willson, Philip J., to Chrysler Corporation. Gas generating apparatus. 3,647,393, Cl. 23-281.

Lejnieks, George: *See—*
Mack, Richard C.; Lejnieks, George; and Morrison, Edward D.,3,647,619.

Lensack, Gabriel P.: *See—*
Du Ross, James W.; and Lensack, Gabriel P.,3,647,477.
Lenz, Hans-Joachim: *See—*
Ahlgrim, Michael; Kandler, Joachim; Lenz, Hans-Joachim; Mietens, Gerhard; and Ott, Willy,3,647,514.
Lenzlinger, Martin, to Fairchild Camera and Instrument Corporation. Reachthrough or punchthrough breakdown for gate protection in MOS devices. 3,648,127, Cl. 317-235.
Leonard, Donald E.: *See—*
Cheng, Chin Huan; and Leonard, Donald E.,3,648,018.
Leonard, Loren W. Method for automatically monitoring and servicing the drilling fluid condition in a well bore. 3,646,808, Cl. 73-155.
Lepselter, Martin P.: *See—*
Fritzinger, Larry B.; and Lepselter, Martin P.,3,647,585.
Lerchs, Erik: *See—*
Tillmann, Hans Peter; and Lerchs, Erik,3,648,221.
Lerner, Seymour D.: *See—*
Kritz, Jacob A.; and Lerner, Seymour D.,3,648,225.
Le Rouax, Robert K., to Hydril Company. Blowout preventer. 3,647,174, Cl. 251-1.
Lester, John M. Capacitance responsive control system. 3,648,076, Cl. 307-252.
Lester, William W., to Tracor, Inc. Electrochemical device for producing a record. 3,647,665, Cl. 204-194.
Leszkovszky, Gyorgy: *See—*
Harsanyi, Kalman; Reiter, Jozsef; Korbonits, Dezso; Gonczi, Csaba; Takacs, Kalman; Bako, Erzsebet; Leszkovszky, Gyorgy; Tardos, Laszlo; and Vertesy, Csaba,3,647,809.
Leugering, Hans-Joachim; and Schaum, Helmut, to Farbwerke Hoechst Aktiengesellschaft. Mixtures of polyolefins of high impact strength having an improved transparency. 3,647,922, Cl. 260-876.
Le Vantine, Allan D.; and Benskin, Glen D. Axially and radially adjustable lantern. 3,648,045, Cl. 240-44.2
Levine, David J.; and Sherrill, Bruce E., Jr., to General Electric Company. Masking method in metallic diffusion coating. 3,647,497, Cl. 117-5.5
Levine, Seymour D.; and Diassi, Patrick A., to Squibb, E. R., & Sons, Inc. 2-Position ketals of A-norandrostanes and derivatives thereof. 3,647,820, Cl. 260-340.9
Levolor Lorentzen, Inc.: *See—*
Anderle, Joseph A., 3,646,986.
Lewis, Brian Mark: *See—*
Taysom, Patrick Arnold; Lewis, Brian Mark; and Kittel, Clive Francis,3,646,810.
Lewis, Le Roy: *See—*
Todd, Hoyt H.; McIntyre, John F.; and Lewis, Le Roy,3,647,572.
Libbey-Owens-Ford Company: *See—*
Long, Bernard, 3,647,409.
Lierke, Ernst G.: *See—*
Gauthier, William D.; and Lierke, Ernst G.,3,647,143.
Lijbrink, Eduard: *See—*
Piepers, Gijsbrecht G.; Vons, Leonard H.; Van Der Linde, Aart; and Lijbrink, Eduard,3,646,994.
Lilly, Eli, and Company: *See—*
Cooper, Robin D. G., 3,647,786.
Cooper, Robin D. G., 3,647,787.
Soper, Quentin Francis, 3,647,793.
Limberger, Walter, to Lumoprint Zindler KG. Combined separating and deflecting device for copying materials, more particularly for copying machines. 3,647,208, Cl. 271-64.
Limbert, Raymond Walter, to Viatron Computer Systems Corporation. Card punch reader adapter. 3,648,036, Cl. 235-154.
Limbert, William F., Jr. Nestable container. 3,647,112, Cl. 220-97.
Lind, James N., to United States of America, Air Force. Frequency adaptive transmitter to avoid jamming. 3,648,287, Cl. 343-18.
Lind, James W.: *See—*
Barnard, John D.; Gaito, Carl C.; Giedo, Gary R.; Greene, Thomas G.; Lind, James W.; Perkins, Merlyn H.; and Pross, Charles M.,3,648,175.
Lindberg, Victor L.: *See—*
Harvey, James E.; Irland, Max J.; and Lindberg, Victor L.,3,647,285.
Lindblad, Lars Alfred; and Kahlbom, Nils Rune, to Jungner Instrument Aktiebolag. Coulometric titration apparatus. 3,647,668, Cl. 204-195.
Lindblom, Robert O., to Dow Chemical Company, The. Vapor phase metal plating process. 3,647,524, Cl. 117-107.1
Lindqvist, Per-Erik: *See—*
Gustavson, Lars-Goran; and Lindqvist, Per-Erik,3,646,776.
Lindsay, Charles H., to Fire Control Engineering Company. Apparatus for admixing fluids in predetermined proportions. 3,647,002, Cl. 169-16.
Lindsey, Royce D.: *See—*
Davis, William H.; Hornung, Louis M.; Lindsey, Royce D.; and Tanner, Howard C.,3,647,041.
Lingle, Harrison C.; and Langas, Arthur, to Hartco Company. Method of and apparatus for producing uniform lengths of ribbon-connected fastener clips. 3,647,593, Cl. 156-300.
Lipstein, Norman J.: *See—*
Renner, Charles F.; and Lipstein, Norman J.,3,648,086.
Liquid Crystal Industries, Inc.: *See—*
Sharpless, Edward N.; and Davis, Frederick, 3,647,279.
Liss, Thomas P.: *See—*
Potts, John T.; Lange, Lawrence H.; and Liss, Thomas P.,3,647,066.
Litchfield, Edward Francis, to Rootes Motors Limited. Vehicle bodies. 3,647,257, Cl. 296-91.
Lithen, Eric E.: *See—*
Budris, Allan R.; McGowan, Frank J.; Evans, Lewis M.; Wayne, Theodore J.; Lithen, Eric E.; and Darcy, Charles B.,3,646,901.
Litt, Morton H.: *See—*
Anello, Louis G.; Sweeney, Richard F.; and Litt, Morton H.,3,647,887.
Anello, Louis G.; Sweeney, Richard F.; and Litt, Morton H.,3,647,889.
Littell, F. J., Machine Company: *See—*
Wiig, Chester M., 3,647,127.
Little, Arthur D., Inc.: *See—*
Huska, Paul A.; Meissner, Herman P.; and Lamb. Thomas J., 3,647,373.
Johnson, Dennis E.; Woodland, Lawrence R.; Kensler, Charles J.; and Himmelfarb, Philip, 3,647,632.
Little, Little J.; and Hunter, Joe S., to United States of America, Army. Compensated output solid state differential accelerometer. 3,646,818, Cl. 73-517.
Livingston, William L., to Factory Mutual Research Corporation. Combatting fire with ablative water. 3,647,001, Cl. 169-1.
LKB-Produkter AB: *See—*
Jidling, Kjell Esbjorn; and Soderkvist, Lars O. A., 3,646,960.
Lockheed Aircraft Corporation: *See—*
Rostad, Nels C.; and Davis, Walter J., 3,647,315.
Thompson, Edward R., 3,647,471.
Whitla, James, 3,647,165.
Loeb, Leopold, to General Electric Company. Fabric treating method. 3,647,354, Cl. 8-158.
Lojkutz, Bruno V.; Warner, Dale J.; and Schulz, George H., to Gits Bros. Mfg. Co. Twin take-apart high temperature shaft seal. 3,647,227, Cl. 277-40.
Lomax, Donald L., to Gulf & Western Industrial Products Company. Continuous casting dummy bar head casting conveyor. 3,646,989, Cl. 164-274.
Long, Alan Gibson: *See—*
Clark, John Colin; Cowley, Brian Richard; Gregory, Gordon Ian; Kennedy, James; and Long, Alan Gibson,3,647,788.
Long, Bernard, to Libbey-Owens-Ford Company. Method and apparatus for heat treating glass sheets on molten metal. 3,647,409, Cl. 65-117.
Long, John Geoffrey, to Pavelle Corporation, The. Light monitoring device for use with color photographic apparatus. 3,647,296, Cl. 355-38.
Lonnemo, Kurt R.: *See—*
Connett, Donald C.; Olsen, Gerald N.; and Lonnemo, Kurt R.,3,646,959.
Lorain Products Corporation: *See—*
Brown, Harold J.; and Winpisinger, Joseph L., 3,648,149.
Loree, Lorne A.; Pierce, Ogden R.; and Kim, Yung Ki, to Dow Corning Corporation. Fluorocarbon silicone compositions. 3,647,740, Cl. 260-37.
Lorenz, Richard: *See—*
Rohloff, Ebbe; and Lorenz, Richard,3,647,926.
Lork, Winfried: *See—*
Sennewald, Kurt; Hauser, Alfred; and Lork, Winfried,3,647,867.
Los, Marinus, to American Cyanamid Company. Substituted naphthofuran compounds. 3,647,821, Cl. 260-340.9
Loudas, Basil L.; and Rice, David E., to Minnesota Mining and Manufacturing Company. Methylol-terminated fluorocarbon polymers. 3,647,891, Cl. 260-633.
Low, John, III: *See—*
Archer, Bill; and Low, John, III,3,646,719.
Lowenstein, M., & Sons, Inc.: *See—*
Hardwicke, James E.; Scheffler, Bernard; and Weisz, Herman S., 3,647,734.
LR Industries Limited: *See—*
Berry, Francis Douglas; and Blyther, Stanley Charles, 3,647,601.
LTV Electrosystems, Inc.: *See—*
Koch, Werner G.; Marchell, Robert H.; and Redmond, William G., 3,646,754.
Usry, Joe D., 3,647,176.
Lubbock, Boyd Smith: *See—*
Dillard, Weldon B., 3,646,824.
Lubowitz, Hyman R.; Kendrick, William P.; Jones, John F.; Thorpe, Richard S.; and Burns, Eugene A., to TRW Inc. Reinforced structural plastics. 3,647,529, Cl. 117-161.
Lubrizol Corporation, The: *See—*
Coleman, Lester E., 3,647,875.
Jennings, Thomas Charles, 3,647,745.
Lucas, Joseph, (Industries) Limited: *See—*
Smith, Trevor Stanley, 3,646,849.
Lucid, Michael F., to Kerr-McGee Corporation. Mixture of alcohols and fluorinated beta-diketones useful as extractant in recovery of vanadium. 3,647,712, Cl. 252-364.
Lucifer S.A.: *See—*
Stampfli, Harald, 3,646,969.
Ludeke, Rudolf: *See—*
Howard, Webster E., Jr.; Ludeke, Rudolf; and Stiles, Phillip J.,3,648,124.

Ludlow Corporation: *See—*
Kaupin, William B., 3,647,061.
Lumoprint Zindler KG.: *See—*
Limberger, Walter, 3,647,208.
Lunn, Lawrence Mark: *See—*
Juroff, Lyle Bruce; and Lunn, Lawrence Mark,3,648,135.
Luongo, Albert M.: *See—*
Dannewitz, Robert E.; and Luongo, Albert M.,3,647,187.
Luzaich, Samuel: *See—*
Furlong, Donn B.; Luzaich, Samuel; and Forchini, James F.,3,647,317.
Lyon, John K.: *See—*
Ross, Louis E.; Lyon, John K.; and Paolucci, Julius J.,3,646,967.
Lyons, James E., to Sun Oil Company. Soluble transition metal catalysts for preparing olefins having an exocyclic double bond. 3,647,896, Cl. 260-666.
Lystad, Leonard A., to General Motors Corporation. Window regulator. 3,646,707, Cl. 49-227.
Lytle, Thomas James, to Union Carbide Corporation. Oxygen trap scarfing method and apparatus. 3,647,570, Cl. 148-9.5
Macco Oil Tool Co., Inc.: *See—*
Elliott, James Kelly; and Crawford, Douglas W., 3,646,953.
MacDermid Incorporated: *See—*
Larson, Gary B., 3,647,568.
Mac Dermid Incorporated: *See—*
Grunwald, John J.; and D'Ottavio, Eugene D., 3,647,512.
MacDonald, Howard R., to Rohr Corporation. Jet propulsion apparatus and operating method. 3,647,020, Cl. 181-33.
MacDonald, John Clifford, to Burlington Industries, Inc. Method of installing invisible seams. 3,647,587, Cl. 156-71.
Macey, Ann M.: *See—*
Macey, James G., 3,647,367.
Macey, James G., 50% to Prestininzi, Pete, and 50% to Macey, Ruth G., and Macey, Ann M. Method for making anhydrous magnesium chloride. 3,647,367, Cl. 23-91.
Macey, Ruth G., and: *See—*
Macey, James G., 3,647,367.
MacFarland, Charles H., to Scott & Fetzer Company, The. Indicating means for a belt lifter. 3,646,632, Cl. 15-339.
Machii, Tetsuo: *See—*
Suenaga, Masanobu; Machii, Tetsuo; Sawano, Takahiro; Kobayashi, Takehiko; Dengo, Tadao; and Nakai, Tetsuzo,3,648,121.
Mack, Richard C.; Lejnieks, George; and Morrison, Edward D., to Eastman Kodak Company. High pressure calendering of a paper web between heated calender rolls having non-resilient surfaces. 3,647,619, Cl. 162-206.
Mackerle, Julius, to Ustav pro vyzkum motorovych vozidel. Self-propelled drive wheels. 3,647,012, Cl. 180-8.
Mackey, Charles L., to Trio Machine and Manufacturing Company, Inc. Hand truck. 3,647,238, Cl. 280-47.29
Macnab, Robert Beattie; Ross, John Sterry Hawley; and Wood, Michael Burke, to International Research & Development Company Limited. Rotary electrical machines. 3,648,082, Cl. 310-10.
Macur, Robert A.: *See—*
Grubb, Willard T.; and Macur, Robert A.,3,647,641.
Maeda, Torata: *See—*
Morita, Shichiro; Shimazu, Hiroshi; Saito, Tsutomu; Nakamura, Hiroshi; and Maeda, Torata,3,647,149.
Maeda, Yo; Suzuki, Satoshi; Nakamura, Yoshiharu; Masubuchi, Yorimitu; Ueyama, Tamotsu; Fukutomi, Naoki; and Takahashi, Hiroshi, to Hitachi Chemical Co., Ltd. Method for connecting conductors. 3,646,670, Cl. 29-627.
Maejima, Norio: *See—*
Yamamoto, Mititake; Uekusa, Genzo; Tanimura, Shigeru; and Maejima, Norio,3,648,117.
Magagnoli, Remo: *See—*
Guzzi, Alberto; Magagnoli, Remo; and Vittore, Lorenzo,3,647,468.
Magerlein, Helmut: *See—*
Rupp, Hans-Dieter; and Magerlein, Helmut,3,647,811.
Magnaflux Corporation: *See—*
Miot-Fijalkowski, Adolf, 3,647,705.
Magnavox Company, The: *See—*
Marshall, Daniel J., 3,647,943.
Mahogany Farms, Inc.: *See—*
Garnett, Donald W., 3,647,343.
Majek, Vladimir; Krajmer, Anton; and Smitmajer, Zdenek, to Vyskumny ustav zvaracsky. Arrangement for adjustment of the position of the supporting posts for a cylindrical body upon which a layer of weld metal is being deposited. 3,648,140, Cl. 318-282.
Majesko, George A., to Driver, Wilber B., Company. Machinable alloys. 3,647,424, Cl. 75-123.
Makabe, Hideki: *See—*
Kubodera, Toshiya; Hara, Tasuku; and Makabe, Hideki,3,647,390.
Makas, Albert S., to Polaroid Corporation. Light-transmitting elements. 3,647,278, Cl. 350-157.
Malcolm, Earl W., to Dexter Corporation, The. Adding cationic material to silicic acid sorbent chromatographic sheet for improved performance. 3,647,684, Cl. 210-31.
Malec, Robert E.; and Betty, Roy J., to Armour Industrial Chemical Company. Carburetor anti-icing composition. 3,647,378, Cl. 44-70.
Mallory Electric Corporation: *See—*
Plume, Alfred, Jr., 3,646,926.
Mallory, P. R., & Co., Inc.: *See—*
Christiansen, Paul J.; and Wallace, Robert F., 3,648,118.
Woodberry, Paul T., 3,647,592.
Malloy, Richard J.; and Malloy, Richard J., to Eastman Kodak Company Eastman Kodak Company. Neutralizing bath for use in photographic processing Neutralizing bath for use in photographic processing. 3,647,449, Cl. 96-50.
Malloy, Richard J.: *See—*
Malloy, Richard J.; and Malloy, Richard J.,3,647,449.
Malster, Robert L., to Polaroid Corporation. Laminations. 3,647,442, Cl. 96-29.
Manes, Dewey K.; Farley, David L.; and Wray, Gary Q., to Halliburton Company. Method and apparatus for testing offshore well. 3,646,995, Cl. 166-0.5
Mangum, Bennie Franklin: *See—*
Drude, Edward H.; and Mangum, Bennie Franklin,3,647,142.
Mankovitz, Roy J., to Teledyne, Inc. Zero voltage switching AC relay circuit. 3,648,075, Cl. 307-252.
Mannesmann Aktiengesellschaft: *See—*
Fiedler, Alfred; and Pepperhoff, Werner, 3,647,575.
Manthey, Harald, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Circular piston internal combustion machine with reduced short circuit flow. 3,647,327, Cl. 418-61.
Manuali, Bertrand Claude Marcel Jean; Doullet, Robert; and Laedlein, Denis Jacques, to Centre National d'Etudes Spatiales. Structural assembly for a three-plate circuit or the like which includes at least one diode or other electronic component. 3,648,114, Cl. 317-101.
Manuel, Ernesto H.: *See—*
Gor, Vishnu J.; and Manuel, Ernesto H.,3,647,520.
Manufacture de Machines du Haut-Rhin: *See—*
Gross, Gabriel, 3,647,200.
Mao, George W., to Gould-National Batteries, Inc. Battery electrode grids made from tin-lithium-lead alloy. 3,647,545, Cl. 136-26.
Marason, Gabriel, Jr.: *See—*
Baginski, Albert R.; De Gelder, Jacob; and Marason, Gabriel, Jr.,3,646,703.
Marbelite Company, Inc., The: *See—*
Cahill, Michael R., 3,648,235.
Marchell, Robert H.: *See—*
Koch, Werner G.; Marchell, Robert H.; and Redmond, William G.,3,646,754.
Marchetti, John W.; and Kiser, Herbert H., to Budd Company, The. Automatic battery charger circuit. 3,648,189, Cl. 320-39.
Marconi, Walter: *See—*
Cesca, Sebastiano; Roggero, Arnaldo; and Marconi, Walter,3,647,767.
Marcus, Ernst. Stepless variable transmission. 3,646,825, Cl. 74-63.
Marino, Francis C., to Digitronics Corporation. Modulator using a harmonic filter. 3,648,195, Cl. 332-14.
Marley Company, The: *See—*
Fordyce, Homer E., 3,647,191.
Marquarding, Dieter; Ugi, Ivar V.; Kleimann, Helmut; and Hoffmann, Peter, to Farbenfabriken Bayer Aktiengesellschaft. N-acyl-α-amino-acid amines or peptides and their production. 3,647,775, Cl. 260-112.5
Marquardson, Kent F. Overflow structure ir lectrolytic cell or the like. 3,646,961, Cl. 137-577.
Marsan, Arthur E. Drainage pouch and method of making. 3,646,936, Cl. 128-283.
Marsee, Frederick J., to Ethyl Corporation. Reducing engine emissions. 3,646,921, Cl. 123-117.
Marshall, Daniel J., to Magnavox Company, The. Transducer system and method. 3,647,943, Cl. 178-5.4
Marshall, Douglas Woodworth; and Pett, Edgar A., to Norton Company. Method of making fragmented crystalline material. 3,646,713, Cl. 51-309.
Marshall Richards Barcro Limited: *See—*
Pamplin, John W., 3,647,154.
Marshall, William J.: *See—*
Ehrich, Felix Frederick; and Marshall, William J.,3,647,494.
Marti, Rueben A.: *See—*
Back, Sangho E.; and Marti, Rueben A.,3,647,618.
Martin, Alan. Mandrel rivet setting tool. 3,646,800, Cl. 72-391.
Martin, David R.; and Sauter, Walter A., to American Nucleonics Corporation. Adjacent channel measurement test system. 3,648,176, Cl. 325-133.
Martin, Hans. Safety ski binding. 3,647,233, Cl. 280-11.35
Martin, Henry Woods, to Nugent, William W., & Co., Inc. Filter. 3,647,084, Cl. 210-492.
Martin, John C.; and Thompson, William L., to Bailey Meter Company. Silicon pressure transducer circuit. 3,646,815, Cl. 73-398.
Martin, Salvador Olive: *See—*
Henrici, Gisela Henrici; and Martin, Salvador Olive,3,647,902.
Martin, Tellis A., to Mead Johnson & Company. Zinc mercaptide N-acetylcysteine carboxylate salts. 3,647,834, Cl. 260-429.9
Martin, Warren L.: *See—*
United States of America,National Aeronautics and Space Administration, Administrator, 3,648,250.
United States of America,National Aeronautics and Space Administration, Administrator, 3,648,256.
Martin, William A.: *See—*
Cator, Edward J.; and Martin, William A.,3,647,125.
Martin-Brower Corporation: *See—*
Schier, Jacques, 3,648,010.
Martinmaas, Werner W. Self-propelled vehicle. 3,646,905, Cl. 115-70.

Marvel Engineering Company: *See—*
Niccum, Forest G.; Kudlaty, Walter J.; Dauer, Charles W.; and Heinrich, Peter, Jr., 3,647,083.
Masaki, Tatsuo: *See—*
Hanada, Hiroshi; Kitajima, Nobuo; and Masaki, Tatsuo,3,647,427.
Mascitti, Albert A.: *See—*
Sulkowki, Theodore S.; and Mascitti, Albert A.,3,647,865.
Mash, Derek Hubert, to International Telephone and Telegraph Corporation. Manufacture of semiconductor devices. 3,647,581, Cl. 148-175.
Mason, Ronald F.: *See—*
Bauer, Ronald S.; Glockner, Peter W.; Keim, Wilhelm; and Mason, Ronald F.,3,647,915.
Glockner, Peter W.; Keim, Wilhelm; and Mason, Ronald F.,3,647,914.
Massarani, Elena; Nardi, Dante; and Degen, Ludwig, to Societe d'Exploitations Chimiques et Pharmaceutiques Seceph S.A.α-Haloacetylanilino-α-alkoxy-acetophenones. 3,647,879, Cl. 260-570.5
Massey-Ferguson Services N.V.: *See—*
Belford, Bertram C., 3,648,234.
Mastrangelo, Sebastian V. R.: *See—*
Ganci, James B.; and Mastrangelo, Sebastian V. R.,3,647,651.
Mastropole, Alfred J.: *See—*
Hawk, George W.; Geyer, Lewis H.; Mastropole, Alfred J.; and Garnjost, Kenneth D.,3,646,762.
Masubuchi, Yorimitu: *See—*
Maeda, Yo; Suzuki, Satoshi; Nakamura, Yoshiharu; Masubuchi, Yorimitu; Ueyama, Tamotsu; Fukutomi, Naoki; and Takahashi, Hiroshi,3,646,670.
Matsui, Hideki: *See—*
Nomura, Kazuhumi; Nakazato, Kunio; and Matsui, Hideki,3,647,374.
Matsuoka, Chikara: *See—*
Baba, Takashi; and Matsuoka, Chikara,3,647,249.
Matsushita, Akira. Electrodeposition of coating layers on substrate structures. 3,647,661, Cl. 204-181.
Matsushita Denko Kabushiki Kaisha: *See—*
Hara, Kazuhiko; and Imai, Hirozo, 3,648,028.
Matsushita Electric Industrial Co., Ltd.: *See—*
Hasegawa, Nobuo; and Kamo, Takahiro, 3,647,695.
Nakamura, Tadao; Nakamura, Shigeaki; and Kohashi, Tadao, 3,648,052.
Watanabe, Jun; Hosoi, Susumu; Kuwazaki, Masahiro; Ota, Akira; Takata, Toshikatsu; and Asaoka, Junichi, 3,647,552.
Matsushita, Toru; Suzuki, Kunimoto; and Hasegawa, Shoji, to Tokyo Shibaura Electric Co., Ltd. Method of applying coating of metal oxides upon substrates. 3,647,531, Cl. 117-211.
Matsuzaki, Takashi: *See—*
Seki, Toshio; Suzuki, Kozaburo; and Matsuzaki, Takashi,3,647,746.
Matsuzawa, Hideo; Itoh, Hirotoshi; and Yoshioka, Teruhiko, to Mitsubishi Rayon Company, Ltd. Process for recovering dimethylformamide by distillation with dimethylamine addition. 3,647,640, Cl. 203-38.
Mattas, Charles B., to Ampex Corporation. Control circuit for a bi-directional recorder. 3,647,989, Cl. 179-100.2
Mattel, Inc.: *See—*
Baginski, Albert R.; De Gelder, Jacob; and Marason, Gabriel, Jr., 3,646,703.
Chang, Richard S.; Cutler, Stanley; La Branche, Harvey W.; Pearlman, Marshall B.; Ryan, John W.; and Toy, Raymond M., 3,647,927.
Matthews, Charles G. Arc welding electrode holder. 3,648,016, Cl. 219-142.
Matthey, Emile, to Matthey S.A. Methods of machining combs for musical mechanisms. 3,646,848, Cl. 90-11.
Matthey S.A.: *See—*
Matthey, Emile, 3,646,848.
Matthiesen, Albert H., to Sterling Drug Inc. Process of conditioning sewage sludge in system with by-pass valve system for a solvent wash. 3,647,687, Cl. 210-63.
Matthis, Hans: *See—*
Wurst, Helmut; and Matthis, Hans,3,646,631.
Mattingley, Neville John: *See—*
Bowen, Dennis Herbert; Mattingley, Neville John; and Sambell, Ronald Alfred James,3,646,908.
Maurin, Jean, to Compagnie Francaise de Raffinage. Method of preparing diolefins having conjugated double bonds. 3,647,903, Cl. 260-681.
Mayer, Oscar, & Co., Inc.: *See—*
Seiferth, Oscar E.; Goller, Robert L.; Grindrod, Paul E.; and Radloff, Harry L., 3,647,485.
Mayfield, William A.: *See—*
Alexander, Gilbert L.; Neaville, Arthur W.; and Mayfield, William A.,3,647,026.
Maytag Company, The: *See—*
Cotton, Curran D., 3,647,196.
Mazdiyasni, Khodabakhsh S.; Dolloff, Richard T.; and Smith, Jonathan S., II, to United States of America, Air Force. Process for producing high purity, submicron barium and strontium titanate powders. 3,647,364, Cl. 23-51.
Mazelsky, Bernard, to Ara, Inc. Deceleration responsive sensors. 3,647,999, Cl. 200-61.45
Mazor, Stanley: *See—*
Smith, William R.; Rice, Rex; and Mazor, Stanley,3,647,348.
McAlister, Roy E. Dentral drill. 3,646,678, Cl. 32-26.
McAlpin, Silvan E., to Mobil Oil Corporation. Transient damper for pneumatic sound source employing an electromagnet for controlling its release valve. 3,647,019, Cl. 181-0.5
McCall, Marvin A., to Eastman Kodak Company. Preparation of hydroxyalkyl esters of aromatic acids. 3,647,750, Cl. 260-475.
McCann, Gerald P.; and Chase, Frank F., to McCann's Engineering & Mfg. Co. Liquid dispensing device with audible alarm. 3,647,115, Cl. 222-39.
McCann's Engineering & Mfg. Co.:*See—*
McCann, Gerald P.; and Chase, Frank F., 3,647,115.
McCarron, John D.: *See—*
Fiore, Anthony N.; and McCarron, John D.,3,648,181.
McCarthy, Charles D.: *See—*
Foley, Charles F.; McCarthy, Charles D.; and Rabens, Neil W.,3,647,218.
McCawley, Joseph F. Toilet seat guide. 3,646,620, Cl. 4-237.
Mc Coll, Bruce John, to Owens-Illinois, Inc. Tree grasping device. 3,646,976, Cl. 144-242.
McConnell, Robert L.; and Simpson, Jack W., to International Business Machines Corporation. Visual editing system incorporating selectable letter spacing display and associated scale display. 3,648,271, Cl. 340-324.
McCray, Michael L., to General Electric Company. Lock collar for multiple electrical terminal connections. 3,648,223, Cl. 339-75.
McCreary Tire & Rubber Company: *See—*
Mc Gaughey, Robert S.; and Simboli, Paul, 3,646,651.
McDonald, John William, to Du Pont de Nemours, E. I., and Company. Aqueous dispersion of ethylene/vinyl alkanoate copolymer and wax containing neoprene. 3,647,733, Cl. 260-28.5
McDonnell Douglas Corporation: *See—*
Arrance, Frank C.; and Rosa, Albert G., 3,647,554.
Berger, Carl, 3,647,542.
Burrows, Alan A.; and Lehde, Henry C., 3,648,229.
McDonough, Cletus G., to Molex Products Company. Shielded cable connector. 3,648,224, Cl. 339-183.
McDougal, Thomas Larry. Inner pack assembly machine. 3,646,857, Cl. 93-37.
McGahren, William James; Porter, John Norman; and Korshalla, Joseph Daniel, to American Cyanamid Company. 1-Hydroxy- and acetyloxy-3-(1-hexenylazoxy)-2- butanone. 3,647,776, Cl. 260-143.
Mc Gaughey, Robert S.; and Simboli, Paul, to McCreary Tire & Rubber Company. Abrasion and corrosion resistant composite structural materials and the like. 3,646,651, Cl. 29-130.
Mc Gee, John K., to Giddings & Lewis Machine Tool Company. Readout system for selective display of digital data on time-shared conductors. 3,648,244, Cl. 340-172.5
McGinnis, Gerald E., to Westinghouse Electric Corporation. Carbon dioxide sensor. 3,647,392, Cl. 23-254.
McGowan, Frank J.: *See—*
Budris, Allan R.; McGowan, Frank J.; Evans, Lewis M.; Wayne, Theodore J.; Lithen, Eric E.; and Darcy, Charles B.,3,646,901.
McGraw-Edison Company: *See—*
Pfaffenbach, Arthur, 3,646,701.
McGuire, John V.; and Watson, Donald W., to Xerox Corporation. Selective article labeling control form. 3,647,602, Cl. 156-528.
McGuire, Kenyon E. B.: *See—*
Meyer, Bennett A.; and McGuire, Kenyon E. B.,3,648,145.
McGuire, William C.: *See—*
Johnson, James H.; and McGuire, William C.,3,647,118.
McIlhenny, David J.: *See—*
Nixon, Dalbro R. Jr.; McIlhenny, David J.; and Harrell, Marvin L.,3,647,116.
McIntire, Otis R.: *See—*
Rieke, James K.; Behr, Douglas Raymond; and McIntire, Otis R.,3,647,617.
McIntyre, John F.: *See—*
Todd, Hoyt H.; McIntyre, John F.; and Lewis, Le Roy,3,647,572.
McKechnie, Donald B. Air cleaning apparatus. 3,646,729, Cl. 55-278.
McKee, Lewis W., to Barden Corporation, The. Stable bearing cage. 3,647,269, Cl. 308-201.
Mc Keithan, Wesley L., to Westinghouse Electric Corporation. High voltage current limiting protective device. 3,648,211, Cl. 337-202.
McKenna, John E. Polyhedral structural system and spatial enclosure. 3,646,718, Cl. 52-79.
McKenna, Patrick A.: *See—*
Doessel, James H.; and McKenna, Patrick A.,3,647,211.
McLain, Charles D.: *See—*
Ford, James A.; Saunders, Stuart R.; Caule, Elmer J.; and McLain, Charles D.,3,646,946.
McLaughlin, James H.: *See—*
Bajek, Walter A.; and McLaughlin, James H.,3,647,634.
Bajek, Walter A.; and McLaughlin, James H.,3,647,635.
McLean, Peter; and Wilkins, John William, to Terresearch Limited. Pumping equipment. 3,647,319, Cl. 417-143.
McMillan, Peter William; and Partridge, Graham, to English Electric Company Limited, The. Glass-ceramics. 3,647,489, Cl. 106-39.
McMillion, Sidney B.: *See—*
Minor, Ronald E.; and McMillion, Sidney B.,3,647,478.
McMurtry, Carl H., to Carborundum Company, The. Protected thermo-couple and protection tube. 3,647,558, Cl. 136-234.

McNab, Ian Roderick: *See—*
Wilkin, Geoffrey Alan; McNab, Ian Roderick; and Appleton, Anthony Derek,3,648,088.

Mc Pherson, Donald F., to Xerox Corporation. Sheet feeding mechanism centering device. 3,647,207, Cl. 271-61.

McQuitty, Jim B.: *See—*
Christoph, Walter P.; McQuitty, Jim B.; and Vendetti, Lewis A.,3,646,814.

Mead Corporation, The: *See—*
Houser, Philip H., 3,647,138.

Mead Johnson & Company: *See—*
Martin, Tellis A., 3,647,834.
Weber, Abraham; Frossard, Jacques Jean; and Bouzard, Daniel, 3,647,877.

Mead, Theodore C.; and Chafetz, Harry. Hydrocarbon oxidation. 3,647,886, Cl. 260-610.

Meadows, Geoffrey W., to Du Pont de Nemours, E. I., and Company. Anisodimensional tungsten carbide platelets bonded with cobalt. 3,647,401, Cl. 29-182.8

Medding, Reuben; and Tyson, Graham Roland, to Consolidated Electronics (Sales) Proprietary Limited. Edge sensing mechanisms. 3,647,123, Cl. 226-22.

Medema, Dirk; Brunmayer-Schilt, Willy; and Van Helden, Robert, to Shell Oil Company. Olefin disproportionation. 3,647,908, Cl. 260-683.

Medical Development Corporation: *See—*
Holbrook, Le Grand K.; and Ostler, David S., 3,646,935.

Mefina S.A.: *See—*
Fresard, Marcel, 3,646,900.

Mehandjiev, Marin Russev, to Nautchno-Izsledovatelski Institut Po Tzvetna Metalurgiya. Electrode with aerolifting and gas-separation effect for electrolysis of solutions of electrolytes. 3,647,672, Cl. 204-284.

Meier, Hans, to Joh. Vaillant KG. Forced-circulation hot water heating system. 3,647,136, Cl. 237-8.

Meikleham, Virginia F.: *See—*
Barnett, Allen M.; Jensen, Harold A.; and Meikleham, Virginia F.,3,647,578.

Meinhardt, James R., to Keystone Consolidated Industries, Inc. Adjustable swivel glide. 3,646,633, Cl. 16-42.

Meininger, Fritz; and Hahnle, Reinhard, to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius Bruning. Process for the manufacture of benzoxazolone-6-β- hydroxy-ethyl-sulfone. 3,647,813, Cl. 260-307.

Meissner, Herman P.: *See—*
Huska, Paul A.; Meissner, Herman P.; and Lamb. Thomas J.,3,647,373.

Melanson, Leslie B.: *See—*
Berendt, Gerard C.; and Melanson, Leslie B.,3,646,637.

Melikian, Gorken; and Biancardi, Frank R., to United Aircraft Corporation. Semi-closed cycle gas laser system. 3,648,194, Cl. 331-94.5

Meltsner, Bernard R.: *See—*
Zaweski, Edward F.; and Meltsner, Bernard R.,3,647,749.

Menasco Manufacturing Company: *See—*
Bhutani, Harish K.; and Kendall, Giles A., 3,647,199.

Menashi, Jameel; and Troiano, Paul F., to Cabot Corporation. Process for decolorizing dry cleaning solvents. 3,647,685, Cl. 210-39.

Mennesson, Andre Louis, to Societe Industrielle de Brevets et d'Etudes S.I.B.E. Fuel feed devices for internal combustion engines. 3,646,914, Cl. 123-32.

Mennicken, Gerhard: *See—*
Wagner, Kuno; and Mennicken, Gerhard,3,647,848.

Mercier, Andre, to Fives Lille-Cail. Continuously operating centrifugal separator. 3,647,135, Cl. 233-1.

Merck & Co., Inc.: *See—*
Hinkley, David F.; and Conn, John B., 3,647,858.
Ziegler, Carl; and Sprague, James M., 3,647,873.

Meroney, Albert H. System for filling a flexible sealable container. 3,646,723, Cl. 53-390.

Merrill, Stewart H.: *See—*
Borden, Douglas G.; Unruh, Cornelius C.; and Merrill, Stewart H.,3,647,444.

Merryman, Jerry Dale,, to Texas Instruments, Incorporated. Digital cathode-ray tube linearity corrector. 3,648,097, Cl. 315-24.

Mertens, Willi, to Siemens Aktiengesellschaft. Insulating tape for producing an insulating sleeve for electrical conductors, impregnated with a thermosetting impregnation epoxy resin mixture. 3,647,611, Cl. 161-163.

Messer Griesheim GmbH: *See—*
Hahne, Siegfried, 3,647,131.

Messer. Grisheim GmbH: *See—*
Hahne, Siegfried, 3,647,130.

Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung: *See—*
Muller, Heinz-Dieter, 3,647,162.
Schoneborn, Hellmuth, 3,648,286.

Messina, Peter: *See—*
Rosenweig, Ronald E.; and Resnick, Joseph,3,648,269.

Messman, Henry C., 1/2 to d'Ouville, Edmond L. Slow-release fertilizer spike having high crush-resistance. 3,647,416, Cl. 71-29.

Metcalfe, Joseph E., III: *See—*
Boos, Donald L.; and Metcalfe, Joseph E., III,3,648,126.

Metz, Robert Lee; and Greenblum, Carl, to Bunker-Ramo Corporation, The. Graphic display system. 3,648,270, Cl. 340-324.

Meyer, Bennett A.; and McGuire, Kenyon E. B., to Singer Company, The, mesne. Undervoltage protection device. 3,648,145, Cl. 320-13.

Meyer, Donald R.: *See—*
Carr, Albert A.; Meyer, Donald R.; Carr, Albert A.; Meyer, Donald R.; and Klein, Georg Anton,3,647,797.
Carr, Albert A.; Meyer, Donald R.; Carr, Albert A.; Meyer, Donald R.; and Klein, Georg Anton,3,647,797.

Meyer, Emilio G., to Mine Safety Appliances Italiana, S.p.A. Paramagnetic gas measuring device. 3,646,803, Cl. 73-27.

Meyer, Erwin; Brendel, Klaus-Dieter; Blau, Hans; and Stoof, Gerhard, to Grunzweig & Hartmann AG. Sound absorber construction. 3,647,022, Cl. 181-33.

Meyer, Gerhard: *See—*
Schulze, Ulrich; and Meyer, Gerhard,3,647,878.

Michaels, Glenn O., to Atlantic Richfield Company. Regeneration of chromia alumina dehydrogenation catalyst. 3,647,909, Cl. 260-683.3

Middelkoop, James H.; and Bigelow, Edward J., to North American Rockwell Corporation. Sealing cartridge assembly and ring element therefor. 3,647,226, Cl. 277-35.

Middleton, Robert E. Contact lens holder. 3,647,380, Cl. 51-235.

Mierley, George M., Sr.: *See—*
Wootton, Horace; and Mierley, George M., Sr.,3,647,311.

Mieslinger, Winfried, to Gebr. Buhler Nachfolger GmbH. Brushless direct current motor. 3,648,137, Cl. 318-138.

Mietens, Gerhard: *See—*
Ahlgrim, Michael; Kandler, Joachim; Lenz, Hans-Joachim; Mietens, Gerhard; and Ott, Willy,3,647,514.

Milde, Karl F., Jr. Apparatus for reproducing musical notes from an encoded record. 3,647,929, Cl. 84-1.01

Milewski, Victor, to Valeron Corporation, The. Milling cutter construction. 3,646,650, Cl. 29-105.

Milidantri, Thomas; and Brill-Edwards, Harry W., to Chromalloy American Corporation. Impact resistant coatings for cobalt-base super- alloys and the like. 3,647,517, Cl. 117-71.

Miller, Gerald K., to Schlumberger Technology Corporation. Method and apparatus for use in processing well logging data. 3,648,278, Cl. 340-347.

Miller, Walter L.: *See—*
Pruitt, Charles N.; Segars, Douglas L.; and Miller, Walter L.,3,647,336.

Millman, Victor; and Gray, Wallie P., to Rohr Corporation. Sound suppression system. 3,647,021, Cl. 181-33.

Mills, Karl D.: *See—*
Anderson, Robert K.; and Mills, Karl D.,3,648,001.

Milton, Floyd W. Snowmobile dollies. 3,647,237, Cl. 280-47.24

Milton, Thomas J.; and Connell, Lehman J., to General Motors Corporation. Transmission controls. 3,646,828, Cl. 74-484.

Mine Safety Appliances Italiana, S.p.A.: *See—*
Meyer, Emilio G., 3,646,803.

Minnesota Mining and Manufacturing Company: *See—*
Brewitz, Frederick G., 3,648,019.
Loudas, Basil L.; and Rice, David E., 3,647,891.
Moses, Donald W., 3,647,976.
Tagliafico, Giovan Battista; and Grazzini, Ferdinando, 3,647,458.
Wiese, Joseph A., Jr.; and Barte, William B., 3,648,257.

Minnie, Armand F., to Monsanto Company. Extrusion die with adjustable dams. 3,647,346, Cl. 425-466.

Minolta Camera Kabushiki Kaisha: *See—*
Sekida, Minoru, 3,646,868.

Minor, Robert N.: *See—*
Stager, Francis W.; and Minor, Robert N.,3,647,111.

Minor, Ronald E.; and McMillion, Sidney B., to Eskimo Pie Corporation. Method for extrusion of ice cream. 3,647,478, Cl. 99-137.

Misarek, Dusan: *See—*
Kadera, Vaclav; Novotny, Josef; Vondruska, Miloslav; Feierfeil, Jiri; Svoboda, Vlastimil; Misarek, Dusan; Futera, Miroslav; Nacovska, Katerina; Janc, Zbynek; Nemec, Adolf; Penkava, Jiri; and Vitkovec, Zdenek,3,647,312.

Mishiro, Masaru: *See—*
Ogi, Hideo; Ozaki, Haruo; Mishiro, Masaru; Horikawa, Yoshikazu; and Mori, Shunji,3,646,772.

Mississippi Chemical Corporation: *See—*
Brown, Marion L., Jr.; Green, Albert W.; and Blanton, Elmer L., 3,647,412.

Mitchell Industries, Inc.: *See—*
Younkin, James R., 3,648,230.

Mitchell, John Pat. Magnetic dental appliances and methods for using same. 3,646,676, Cl. 32-2.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Obata, Yoshiyuki, 3,648,017.

Mitsubishi Electric Corporation: *See—*
Oke, Syoichi; and Kobayashi, Takanori, 3,647,039.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Suzuki, Yasuhiro; Ikegami, Renpei; and Kishimoto, Takuo, 3,647,090.

Mitsubishi Petrochemical Co., Ltd.: *See—*
Sato, Takehiko; and Sagami, Hiroyuki, 3,647,907.

Mitsubishi Rayon Company, Ltd.: *See—*
Matsuzawa, Hideo; Itoh, Hirotoshi; and Yoshioka, Teruhiko, 3,647,640.

Mitsui Petrochemical Industries, Ltd.: *See—*
Kashiwa, Norio, 3,647,772.
Miyake, Yasuhiko: *See—*
Tanaka, Eihachiro; Fukuda, Takeji; Yamaji, Kenkichi; Miyake, Yasuhiko; Ota, Hiroshi; and Kimura, Katsuo,3,646,796.
Miyao, Hachiro: *See—*
Kuwabara, Takeo; Morimoto, Kazumi; and Miyao, Hachiro,3,648,212.
Miyashiro, James: *See—*
Venerable, James T.; Miyashiro, James; and Seiling, Alfred W.,3,647,849.
Miyashita, Yoshio; Nishikawa, Katuhiko; and Sata, Toshio, to Nippon Kokan Kabushiki Kaisha. Free cutting steel containing small amounts of aluminum and calcium. 3,647,425, Cl. 75-124.
Miyata, Yoshihiko: *See—*
Takemoto, Takeo; Miyata, Yoshihiko; and Kawamura, Takao,3,647,960.
Miyazaki, Hirotoshi: *See—*
Okaya, Takuji; and Miyazaki, Hirotoshi,3,647,756.
Mizuno, Koichi, 1/2 to Taiho Kogyo Co., Ltd. Oil-free slider bearing material and method of making the material. 3,647,500, Cl. 117-21.
Mizuta, Yukio: *See—*
Tateisi, Kazuma; Mizuta, Yukio; and Shizuya, Kyoto,3,648,020.
Mizutani, Takashi; Anzai, Masao; and Ebihara, Akio, to Toppan Printing Company, Limited. Multicolored heat transfer sheet and processes for heat transfer of multicolored ink impressions. 3,647,503, Cl. 117-36.4
Mizutani, Yukio; Yamane, Reiichi; Sata, Toshikatsu; and Izuo, Ryuji, to Tokuyama Soda Kabushiki Kaisha. Cation exchange membrane and method of making same. 3,647,086, Cl. 210-500.
Mlot-Fijalkowski, Adolf, to Magnaflux Corporation. Self-emulsifiable penetrant composition. 3,647,705, Cl. 252-301.2
Mobil Oil Corporation: *See—*
Butter, Stephen A., 3,647,835.
Caesar, Philip D.; Haag, Werner O.; and Wise, John J., 3,647,916.
Kiely, Robert R., 3,647,060.
McAlpin, Silvan E., 3,647,019.
Moduthagam, Michael: *See—*
Baltazzi, Evan S.; Shelffo, Loren EE.; and Moduthagam, Michael,3,646,866.
Moeller & Neumann G.m.b.H.: *See—*
Kreiskorte, Heinz A., 3,646,686.
Mogi, Koya: *See—*
Yokotsuka, Tamotsu; Aonuma, Tatsuo; Mogi, Koya; Fukushima, Danji; Yasuda, Atsushi; Watanabe, Hiroharu; Tsukada, Naoshi; and Arai, Akira,3,647,484.
Mohri, Yoichi, to Nissan Motor Company, Limited. Hydraulic shift valve. 3,646,851, Cl. 91-459.
Molex Products Company: *See—*
McDonough, Cletus G., 3,648,224.
Moll, Franz: *See—*
Huckstadt, Harald; Saleck, Wilhelm; Randolph, August; and Moll, Franz,3,647,469.
Moller, Blasblaserei Inhaber, Gebruder: *See—*
Simon, Wilhelm; Moller, Willi; and Dohner, Rene, 3,647,666.
Moller, Willi: *See—*
Simon, Wilhelm; Moller, Willi; and Dohner, Rene, 3,647,666.
Moller, Willi: *See—*
Simon, Wilhelm; Moller, Willi; and Dohner, Rene,3,647,666.
Mollick, George Michael: *See—*
Pintard, Frederick Bruce; and Mollick, George Michael,3,647,247.
Molly, Hans. Device for controlling quantities which are defined by the product of two measured variables. 3,647,322, Cl. 417-217.
Molybdenum Corporation of America: *See—*
Coltrinari, Enzo L.; and Kindig, James K., 3,647,361.
Monnier, Jean-Pierre, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Pneumatic respirator comprising a fluid-operated alternating change-over switch. 3,646,933, Cl. 128-145.8
Monsanto Company: *See—*
Bills, James L., 3,647,840.
Fallwell, William F., Jr., 3,647,615.
Gieseking, Carl W.; and Sullivan, James D., 3,647,752.
Henrici, Gisela Henrici; and Martin, Salvador Olive, 3,647,902.
Kim, Keun Young; and Shaver, Kenneth J., 3,647,371.
Minnie, Armand F., 3,647,346.
Ridgway, James S.; and Pickett, Oscar A., Jr., 3,647,761.
Skibo, Andrew D.; and Woodworth, Chester L., 3,647,344.
Vineyard, Billy D., 3,647,691.
Montecatini Edison S.p.A.: *See—*
de Varda, Giuseppe; and de Pava, Alberto Vajina, 3,647,673.
Mortillaro, Luigi; Russo, Mario; and Guidotti, Vincenzo, 3,647,765.
Monterey Research Laboratory, Inc.: *See—*
Gray, Robert P.; and Beal, John O., 3,646,807.
Moog Inc.: *See—*
Hawk, George W.; Geyer, Lewis H.; Mastropole, Alfred J.; and Garnjost, Kenneth D., 3,646,762.
Mooney, Ralph. Hinged crane boom stops having controlled braking means. 3,647,087, Cl. 212-59.
Moore, Donald Baker: *See—*
Posson, Philip Lynn; Moore, Donald Baker; and Nicholson, Dallas Earl,3,646,888.
Moore, Glenn E.; Wilson, Fred A.; and Wood, Chester W., to Dover Corporation. Automatic shut-off dispensing nozzle venturi. 3,646,974, Cl. 141-392.
Moore, Thomas M.: *See—*
Dax, Peter R.; and Moore, Thomas M.,3,648,284.
Morgan, Harvey E.; Suttle, Theodore; and Schenck, Jackson C., to Brad Ragan, Inc. Apparatus for removing a tire tread. 3,646,984, Cl. 157-13.
Morgan, John R.: *See—*
Ben Daniel, David J.; Morgan, John R.; and Fielding, John O.,3,647,223.
Morgan, John W., to Procter and Gamble Company, The. Novel esters of chrysanthemic acid and alcohols related to 2-indanol. 3,647,857, Cl. 260-468.
Morgan, Thomas J.: *See—*
Emmel, Henry J.; and Morgan, Thomas J.,3,647,304.
Morgida, Joseph V.: *See—*
Belason, E. Bruce; Castle, George K.; Crowley, Donald P.; and Morgida, Joseph V.,3,647,193.
Mori, Shunji: *See—*
Ogi, Hideo; Ozaki, Haruo; Mishiro, Masaru; Horikawa, Yoshikazu; and Mori, Shunji,3,646,772.
Mori, Takakazu: *See—*
Ito, Shin; Kubo, Seitoku; and Mori, Takakazu,3,646,835.
Morimoto, Kazumi: *See—*
Kuwabara, Takeo; Morimoto, Kazumi; and Miyao, Hachiro,3,648,212.
Morita, Shichiro; Shimazu, Hiroshi; Saito, Tsutomu; Nakamura, Hiroshi; and Maeda, Torata, to Sasebo Heavy Industries Co., Ltd. Apparatus for the separation of wire and its insulating material and recovering these as raw materials. 3,647,149, Cl. 241-65.
Morris, Philip, Incorporated: *See—*
Braginetz, Paul A., 3,646,672.
Morris, Thomas S., to West Point-Pepperell, Inc. Acid bounding nonwoven fabrics. 3,647,591, Cl. 156-220.
Morrison, Charles F., Jr.: *See—*
Denison, Dean R.; and Morrison, Charles F., Jr.,3,648,046.
Morrison, Edward D.: *See—*
Mack, Richard C.; Lejnieks, George; and Morrison, Edward D.,3,647,619.
Morrison, James S., to Du Pont de Nemours, E. I., and Company. Demulsifiers for oil-based emulsions. 3,647,688, Cl. 252-855.
Morse, Mansfield K. Universal hole saw arbor. 3,647,310, Cl. 408-239.
Morse, Philip, to Xerox Corporation. Nonagglomerating blending process. 3,647,713, Cl. 252-408.
Mortillaro, Luigi; Russo, Mario; and Guidotti, Vincenzo, to Montecatini Edison S.p.A. Unsaturated polyamides and process for obtaining same. 3,647,765, Cl. 260-780.
Morton International, Inc.: *See—*
Venerable, James T.; Miyashiro, James; and Seiling, Alfred W., 3,647,849.
Morton-Norwich Products, Inc.: *See—*
Palmer, Jay W., 3,647,368.
Mose, Luciano; and Heuser, Gerhard, to Uhde, Friedrich, GmbH. Cover for electrolytic cell with mercury cathodes and adjustable anodes. 3,647,670, Cl. 204-219.
Moseley, John C.; Schaffer, Rupert E.; and Radziwill, Anthony N., to Shell Oil Company. Process for improving the resistance to soiling of poly(beta-lactone)fibers. 3,647,527, Cl. 117-138.8
Moses, Donald W., to Minnesota Mining and Manufacturing Company. Time sharing subscriber communications system. 3,647,976, Cl. 179-15.
Moskowitz, Seymour, to Curtiss-Wright Corporation. Variable permeability and oxidation resistant airfoil. 3,647,316, Cl. 416-97.
Motorola, Inc.: *See—*
Bruckert, Eugene J., 3,648,190.
Clark, Alfred J., 3,646,821.
Dattilo, Donald J., 3,647,225.
Feder, Alvin, 3,647,158.
Feder, Alvin, 3,647,356.
Frederiksen, Thomas M., 3,648,069.
Frederiksen, Thomas M.; and Russell, Ronald W., 3,648,154.
Lace, Melvin A.; and Repay, Laszlo N., 3,647,986.
Philofsky, Elliott M.; and Ritchie, Kim, 3,647,935.
Single, David, 3,647,522.
Moussoulos, Lucas S. High recovery production of rich FeNi alloys in a converter. 3,647,418, Cl. 75-82.
Mrazek, Dale A., to National Semiconductor Corporation. High speed MOS sense amplifier. 3,648,071, Cl. 307-237.
M&T Chemicals Inc.: *See—*
Reifenberg, Gerald H.; and Considine, William J., 3,647,833.
Mukai, Hisakazu; Kindo, Hideaki; Sugahara, Yoshimasa; and Yamagata, Akinori, to Nippon Telegraph and Telephone Public Corporation. Multiple signal level high speed logic circuit device. 3,648,064, Cl. 307-213.
Muller, Heinz-Dieter, to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung. Flight control circuit for missile spinning about its longitudinal axis. 3,647,162, Cl. 244-3.2
Muller, Jurgen: *See—*
Thate, Kurt; and Muller, Jurgen,3,647,596.
Muller, Paul Adolf, to Celfil Company Establishment. Method and apparatus for producing a tobacco filter rod or cord from a web of fibrous material. 3,646,855, Cl. 93-1.

Mullery, Alvin P.; and Zurcher, Frank W., Jr., to International Business Machines Corporation. Program scheduler for processing systems. 3,648,253, Cl. 340-172.5

Munson, Chester R. Beam lifting apparatus. 3,647,254, Cl. 294-78.

Munson, William A., to Westinghouse Electric Corporation. Protective system for basic oxygen furnace lance. 3,647,198, Cl. 266-34.

Murai, Bunjiro: *See—*
Kabuki, Kimiaki; and Murai, Bunjiro,3,647,727.

Murata Manufacturing Co., Ltd.: *See—*
Fujishima, Satoru; and Honma, Hideo, 3,648,184.

Murato, Kenichi; Takei, Kenji; and Takayama, Masayuki, to Japanese National Railways, and Hitachi Ltd. Controlling system for means for adjusting speeds of freight cars in a yard. 3,646,891, Cl. 104-26.

Murday, David A., to Rohr Corporation. Thrust controlling apparatus. 3,647,141, Cl. 239-265.29

Murphy, Joseph F.: *See—*
Grafton, Jim R.; Wilkins, Glenn E.; and Murphy, Joseph F.,3,646,928.

Murray, Coyt E., to Impact Plastics Inc. Lug strap assembly and method of forming same. 3,646,973, Cl. 139-153.

Murray, Coyt E.; and Boyter, Walter C., to Impact Plastics, Inc. Balloon control ring. 3,646,746, Cl. 57-108.

Muto, Kikuo: *See—*
Sakurai, Masao; and Muto, Kikuo,3,647,340.

Muto, Yuhei: *See—*
Yokota, Ryosuke; and Muto, Yuhei,3,648,049.

Muzhits, Vitold Iosifovich: *See—*
Berzin, Gunard Valdemarovich; Kalnin, Arvid Yanovich; Sushkov, Alexandr Fedorovich; Skrupsky, Voldemar Petrovich; Ziemelis, Andris Eduardovich; Soloviev, Boris Fedorovich; Leeniex, Karl Mikhailovich; Sovetin, Vladimir Kirilovich; Gulbis, Yan Karlovich; Dalbinsh, Yan Yanovich; Priede, Bruno Andreevich; Upman, Karl Kristapovich; Muzhits, Vitold Iosifovich; Junga, Yan Petrovich; Krogzem, Ivar Arnoldovich; Greitan, Zigurd Boleslavovich; and Rotsen, Karl Arturovich,3,646,687.

Myers, Charles T.: *See—*
Kappelman, Benjamin O.; and Myers, Charles T.,3,646,648.

Myers, Lester W., to Electronic Communications, Inc. Gross leak detector and method. 3,646,804, Cl. 73-45.5

Mysik, Stanislav; and Trneny, Jaromir, to Kaucuk, narodni podnik. Process for preparing expandable vinyl aromatic polymers. 3,647,723, Cl. 260-2.5

Naber, Charles T., to National Cash Register Company. Method of controllably oxidizing a silicon wafer. 3,647,535, Cl. 117-212.

Nacovska, Katerina: *See—*
Kadera, Vaclav; Novotny, Josef; Vondruska, Miloslav; Feierfeil, Jiri; Svoboda, Vlastimil; Misarek, Dusan; Futera, Miroslav; Nacovska, Katerina; Janc, Zbynek; Nemec, Adolf; Penkava, Jiri; and Vitkovec, Zdenek,3,647,312.

Nagai, Haruo; and Sugiyama, Naohisa, to Kyowa Gas Chemical Industry Co., Ltd. Infrared-absorbent methyl methacrylate resin composition and shaped articles thereof. 3,647,729, Cl. 260-23.

Nagamatsu, Kazuo; Yoshino, Masatsugu; Konno, Tsugio; and Ishida, Shinichi, to Asahi Kasei Kogyo Kabushiki Kaisha. Glass fibre reinforced polyacetal resin composition. 3,647,743, Cl. 260-37.

Nagata, Yasunori: *See—*
Ishizawa, Kazutomo; Nagata, Yasunori; Abe, Junnosuke; and Fukuoka, Akira,3,646,992.

Nagel, Erich: *See—*
Koleff, Boris; and Nagel, Erich,3,646,870.

Nagy, Charles E.; and Nagy, John F. Theft-proof lockable coupling device. 3,647,243, Cl. 280-433.

Nagy, John F.: *See—*
Nagy, Charles E.; and Nagy, John F.,3,647,243.

Nagy, John R., to Bendix Corporation, The. Auxiliary circuit for electronic fuel control systems to facilitate cold starting. 3,646,917, Cl. 123-32.

Nagy, John R.; and Rachel, Todd L., to Bendix Corporation, The. Cold start auxiliary circuit for electronic fuel control system. 3,646,918, Cl. 123-32.

Nahirny, John: *See—*
Krajewski, Werner; and Nahirny, John,3,648,136.

Naito, Han-Ichiro; and Yamaguchi, Tsuneo, to Elecompack Company Limited. Stationary stack assembly with remotely controlled access. 3,648,241, Cl. 340-147.

Nakaguchi, Kohei; Kawasumi, Shohachi; Hirooka, Masaaki; Yabuuchi, Hiroshi; and Takao, Hiroyoshi, to Sumitomo Chemical Company, Ltd. Alternating copolymers of conjugated compounds and unsaturated hydrocarbon compounds and process for production thereof. 3,647,753, Cl. 260-63.

Nakaguchi, Kohei; Kawasumi, Shohanchi; Hirooka, Masaaki; and Yabuuchi, Hiroshi, to Sumitomo Chemical Company, Ltd. Alternating copolymers of alpha-olefins and vinyl compounds and a process for manufacturing the same. 3,647,771, Cl. 260-86.7

Nakahara, Tsuneo; Kurauchi, Noritaka; and Kitani, Hiroshi, to Sumitomo Electric Industries, Ltd. Circular leaky waveguide train communication system. 3,648,172, Cl. 325-51.

Nakai, Tetsuzo: *See—*
Suenaga, Masanobu; Machii, Tetsuo; Sawano, Takahiro; Kobayashi, Takehiko; Dengo, Tadao; and Nakai, Tetsuzo,3,648,121.

Nakajima, Hayato: *See—*
Takehisa, Masaki; Kawakami, Waichiro; Nakajima, Hayato; and Hosaki, Yoshihiko,3,646,950.

Nakajima, Yasuo; and Hayashi, Yoshimasa, to Nissan Motor Company, Limited. Air-pollution preventive system for motor vehicles. 3,646,764, Cl. 60-279.

Nakamura, Hiroshi: *See—*
Morita, Shichiro; Shimazu, Hiroshi; Saito, Tsutomu; Nakamura, Hiroshi; and Maeda, Torata,3,647,149.

Nakamura, Hiroyasu: *See—*
Goto, Kimio; and Nakamura, Hiroyasu,3,647,975.

Nakamura, Nobuo: *See—*
Tanaka, Masao; Nakamura, Nobuo; and Takasawa, Seigo,3,647,627.

Nakamura, Shigeaki: *See—*
Nakamura, Tadao; Nakamura, Shigeaki; and Kohashi, Tadao,3,648,052.

Nakamura, Tadao; Nakamura, Shigeaki; and Kohashi, Tadao, to Matsushita Electric Industrial Co., Ltd. Solid-state image converting device. 3,648,052, Cl. 250-213.

Nakamura, Yoshiharu: *See—*
Maeda, Yo; Suzuki, Satoshi; Nakamura, Yoshiharu; Masubuchi, Yorimitu; Ueyama, Tamotsu; Fukutomi, Naoki; and Takahashi, Hiroshi,3,646,670.

Nakaya, Naohisa, to Iwatsu Electric Co., Ltd. Comparison amplifier. 3,648,068, Cl. 307-228.

Nakaya, Naohisa, to Iwatsu Electric Co., Ltd. Circuit for indicating a delay time of a delayed pulse. 3,648,080, Cl. 307-293.

Nakayama, Kiyoshi, to Kyowa Hakko Kogyo Co., Ltd. Process for producing L-threonine. 3,647,628, Cl. 195-29.

Nakazato, Kunio: *See—*
Nomura, Kazuhumi; Nakazato, Kunio; and Matsui, Hideki,3,647,374.

Nance, Robert L., to AMF Incorporated, mesne. Article detecting and counting apparatus. 3,648,054, Cl. 250-223.

Nardi, Dante: *See—*
Massarani, Elena; Nardi, Dante; and Degen, Ludwig,3,647,879.

National Cash Register Company: *See—*
Naber, Charles T., 3,647,535.

National Cash Register Company, The: *See—*
Trimble, Cebern B., 3,648,261.

National Research Development Corporation: *See—*
Bonnar, John, 3,646,929.
Elliott, Michael, 3,647,824.
Laithwaite, Eric Roberts; and Bolton, Hugh Robert, 3,648,084.
Shillam, Norman Frederick, 3,646,839.

National Semiconductor Corporation: *See—*
Mrazek, Dale A., 3,648,071.

National Starch and Chemical Corporation: *See—*
Stockmann, Hans H.; and Ray-Chaudhuri, Dilip K., 3,647,763.

National Steel Corporation: *See—*
Wegener, Hans F., 3,647,045.

Naugle, Gene O.; and Harding, Billie R. Tooth extracting instrument. 3,646,679, Cl. 32-47.

Nauser Konmanditgesellschaft: *See—*
Hammes, Wilhelm, 3,647,110.

Nautchno-Izsledovatelski Institut Po Tzvetna Metalurgiya: *See—*
Mehandjiev, Marin Russev, 3,647,672.

Naydan, Theodore T., to Environment/One Corporation. Hydraulic chamber incorporating a jet nozzle. 3,647,137, Cl. 239-102.

NcNeil, Donald J., Sr.; and Deline, Richard R., to Esco Corporation. Tree shearing apparatus. 3,646,975, Cl. 144-34.

Neal, Gordon L., to Collins Radio Company. Control system filtering technique. 3,648,031, Cl. 235-150.1

Neal, Warren D., to Aerojet-General Corporation. Sprocket drive tensioning mount for conveyors. 3,647,050, Cl. 198-203.

Neaville, Arthur W.: *See—*
Alexander, Gilbert L.; Neaville, Arthur W.; and Mayfield, William A.,3,647,026.

Neill, Henry R.: *See—*
Ganong, William L., Jr.; Bryant, Furnie S.; Neill, Henry R.; and Davies, Robert G.,3,648,027.

Neinhuis, Rijkent Jan, to U.S. Philips Corporation. Insulated gate field effect transistor with integrated safety diode. 3,648,129, Cl. 317-235.

Nelson, Merritt J. Shower head. 3,647,145, Cl. 239-460.

Nelson, Paul A., to United States of America, Atomic Energy Commission. Reprocessing a plutonium dioxide-molybdenum fuel. 3,647,421, Cl. 75-84.1

Nemec, Adolf: *See—*
Kadera, Vaclav; Novotny, Josef; Vondruska, Miloslav; Feierfeil, Jiri; Svoboda, Vlastimil; Misarek, Dusan; Futera, Miroslav; Nacovska, Katerina; Janc, Zbynek; Nemec, Adolf; Penkava, Jiri; and Vitkovec, Zdenek,3,647,312.

Nerem, Marvin E. Load transfer switch assembly. 3,647,997, Cl. 200-50.

Nervik, Torbjorn, to ESB Incorporated. Process for removal of nitrates from sintered nickel plaques impregnated with nickel salts. 3,647,547, Cl. 136-75.

Ness, Richard A. Reinforcing element for muscles. 3,646,615, Cl. 3-1.

Neville, James J.: *See—*
Fitzpatrick, Hugh M.; Neville, James J.; Thompson, John; and Boggs, Fitzhugh W.,3,648,226.

New Nippon Electric Co., Ltd.: *See—*
Yoshikawa, Sadayoshi, 3,647,950.

New, Thorndike C. T.: *See—*
Ernick, Frederick G.; New, Thorndike C. T.; and Walczak, Donald A.,3,648,123.

Newell, Stephen D.: *See—*
De Long, Charles, Jr.; and Newell, Stephen D.,3,647,139.
Newkirk, Marc S.; and Zulkowski, Peter, W., to International Materials. Fuel system for gaseous fueled engines. 3,646,924, Cl. 123-120.
Newman, Douglas A., to Columbia Ribbon and Carbon Manufacturing Co., Inc. Pressure-sensitive transfer elements. 3,647,502, Cl. 117-36.1
NGK Insulators, Ltd.: *See—*
Okada, Toru; and Takatori, Toshimitsu, 3,647,933.
Niccum, Forest G.; Kudlaty, Walter J.; Dauer, Charles W.; and Heinrich, Peter, Jr., to Marvel Engineering Company. Slip-on filter structure. 3,647,083, Cl. 210-236.
Nicholoson, Iver Val, to Kiddie World Toys, Ltd. Doll cutouts and process of making same. 3,646,705, Cl. 46-157.
Nichols, Arthur E., Jr.: *See—*
Heiligenthal, Harry E.; and Nichols, Arthur E., Jr.,3,646,652.
Nicholson, Dallas Earl: *See—*
Posson, Philip Lynn; Moore, Donald Baker; and Nicholson, Dallas Earl,3,646,888.
Nicollian, Edward Haig: *See—*
Berglund, Carl Neil; and Nicollian, Edward Haig,3,648,122.
Niedner, Peter; Diez, Gerhard; and Thubeauville, Heinz. Process for mixing gases, liquids or finely grained solids with a carrier gas and for the manufacture of reaction products. 3,647,357, Cl. 23-1.
Nigro, Louis V., to Gillette Company, The. Metering dispensing valve. 3,647,122, Cl. 222-501.
Nikex Nehezipari Kulkereskedelmi: *See—*
Halmai, Attila; and Halmai, Geza, 3,646,892.
Nikki, Masao: *See—*
Imai, Masaya; Izubayashi, Masuji; Takiyama, Keiichi; Hirai, Mitsuo; and Nikki, Masao,3,647,904.
Nilsen, Arnold E., to NL Industries, Inc. Extraction of iron from titaniferous ores. 3,647,414, Cl. 75-1.
Nilsson, Ove Karl-Gustav: *See—*
Andersson, John Lennart; and Nilsson, Ove Karl-Gustav,3,647,548.
Nippon Columbia Kabushikikaisha(Nippon Columbia Co., Ltd.): *See—*
Ise, Hideo, 3,647,338.
Nippon Kogaku K.K.: *See—*
Fujii, Tatsuo, 3,646,861.
Ono, Shigeo, 3,646,867.
Nippon Kokan Kabushiki Kaisha: *See—*
Kawato, Tomoyoshi; Kusakabe, Takashi; and Ono, Toshiyuki, 3,648,008.
Miyashita, Yoshio; Nishikawa, Katuhiko; and Sata, Toshio, 3,647,425.
Yamagishi, Hidehisa; Gunji, Naoki; and Takeuchi, Masao, 3,647,650.
Yamaguchi, Yoshio; and Watanabe, Osamu, 3,646,806.
Nippon Shokubai Kagaku Kogyo Co., Ltd.: *See—*
Imai, Masaya; Izubayashi, Masuji; Takiyama, Keiichi; Hirai, Mitsuo; and Nikki, Masao, 3,647,904.
Nippon Steel Corporation: *See—*
Ogi, Hideo; Ozaki, Haruo; Mishiro, Masaru; Horikawa, Yoshikazu; and Mori, Shunji, 3,646,772.
Okamoto, Kazuo; Eguchi, Naoki; Sakao, Nasuo; Honda, Ichiro; and Suzuki, Eizo, 3,647,571.
Nippon Telegraph and Telephone Public Corporation: *See—*
Mukai, Hisakazu; Kindo, Hideaki; Sugahara, Yoshimasa; and Yamagata, Akinori, 3,648,064.
Nishikawa, Katuhiko: *See—*
Miyashita, Yoshio; Nishikawa, Katuhiko; and Sata, Toshio,3,647,425.
Nishio, Daijiro: *See—*
Ohe, Keitaro; Nishio, Daijiro; and Sadamatsu, Shigeru,3,647,773.
Nissan Jidosha Kabushiki Kaisha: *See—*
Toma, Setsuo, 3,647,037.
Nissan Motor Company, Limited: *See—*
Mohri, Yoichi, 3,646,851.
Nakajima, Yasuo; and Hayashi, Yoshimasa, 3,646,764.
Nitto Kasei Co., Ltd.: *See—*
Seki, Toshio; Suzuki, Kozaburo; and Matsuzaki, Takashi, 3,647,746.
Nitzsche, Siegfried; Kaiser, Wolfgang; Wohlfarth, Ernst; and Hittmair, Paul, to Wacker-Chemie G.m.b.H. Room temperature vulcanizable silicone rubber stocks. 3,647,725, Cl. 260-18.
Nixon, Dalbro R. Jr.; McIlhenny, David J.; and Harrell, Marvin L., to Virginia Chemicals Inc. Mounting bracket for periodically dispensing aerosol bombs. 3,647,116, Cl. 222-70.
NL Industries, Inc.: *See—*
Cline, Charles W., 3,647,495.
Nilsen, Arnold E., 3,647,414.
Nolan, Matthew P. Wet sand blast gun. 3,646,709, Cl. 51-8.
Nolin, Roger J.; and Brizzi, Anthony F., to Tool Research & Engineering Corporation. Guide for fasteners. 3,647,252, Cl. 292-357.
Nolting, Jerry L.; and Rouse, Alan D., to Texaco Inc. Automatic pour point measuring method and apparatus. 3,646,802, Cl. 73-17.
Nomura, Kazuhumi; Nakazato, Kunio; and Matsui, Hideki, to Sumitomo Chemical Company, Ltd. Method for separating alcohols and hydrated alumina from hydrolysts products of aluminum alkoxides. 3,647,374, Cl. 23-143.
Nord-Aviation Societe Nationale de Constructions Aeronautiques: *See—*
Lavarenne, Jean, 3,648,267.
Norman, Leslie W.; Hunter, Skillman C.; and Perrone, George L., to Garrett Corporation, The. Method and apparatus for starting detonation combustion engines. 3,646,761, Cl. 60-204.
Norrenberg-Sudhaus, Ernst, to Heinrich Sudhaus Sohne Metallwarenfabrik. Closure for suitcases and the like with jimmy-proof locking mechanism. 3,646,787, Cl. 70-70.
Norris, James D., to Thermal Process Engineering Company. Cooking grill. 3,646,880, Cl. 99-349.
North American Rockwell Corporation: *See—*
Christie, Joseph H.; and Humphrey, James R., 3,647,549.
Middelkoop, James H.; and Bigelow, Edward J., 3,647,226.
Powell, Charles Perry, 3,647,065.
Wetch, Joseph R.; Sudar, Seymour; and Bienvenue, Louis L., 3,647,394.
North, William D.: *See—*
Castrucci, Paul P.; Grochowski, Edward G.; North, William D.; and Palfi, Thomas L.,3,648,130.
Northern Electric Company Limited: *See—*
van der Puije, Patrick David, 3,647,982.
Norton Company: *See—*
Cook, Arnold M., 3,647,147.
Marshall, Douglas Woodworth; and Pett, Edgar A., 3,646,713.
Norton, Thomas R., to Global Marine Inc. Steering sub for underwater drilling apparatus. 3,647,007, Cl. 175-5.
Norz, Richard: *See—*
Nuber, Otto; and Norz, Richard,3,646,779.
Notaro, Frank, to Union Carbide Corporation. Semirigid multilayer thermal insulation and method of making same. 3,647,606, Cl. 161-52.
Novar Corporation: *See—*
Smith, Roland T., 3,647,042.
Novotny, Josef: *See—*
Kadera, Vaclav; Novotny, Josef; Vondruska, Miloslav; Feierfeil, Jiri; Svoboda, Vlastimil; Misarek, Dusan; Futera, Miroslav; Nacovska, Katerina; Janc, Zbynek; Nemec, Adolf; Penkava, Jiri; and Vitkovec, Zdenek,3,647,312.
NRM Corporation: *See—*
Gazuit, Georges, 3,647,598.
Nuber, Otto; and Norz, Richard, to Fouquet-Werk, Frauz & Planck. Knitting machine for knitting double face jacquard pattern material. 3,646,779, Cl. 66-25.
Nugent, William W., & Co., Inc.: *See—*
Martin, Henry Woods, 3,647,084.
Nurnberg, Richard K., to Robertshaw Controls Company. On-off controller with solid state differential circuit. 3,648,074, Cl. 307-252.
Nussbaum, Hans Georg: *See—*
Schroder, Jurgen; and Nussbaum, Hans Georg,3,648,272.
N.V. Koninklijke Sphinx-Ceramique v/h Pegout: *See—*
Claessens, Frans D.; and Hein, Theodore F., 3,647,345.
N. V. Bataafsche Rubber Industrie 'Radium': *See—*
van Lieshoud, Leonardus J. M., 3,646,983.
Nyby Bruks Aktiebolag: *See—*
Gunnarsson, Karl Einar, 3,647,686.
Oak Electro/Netics Corporation: *See—*
Tap, Henry H., 3,646,823.
Oaks, Seibert S.; and Kita, John F., to Kennametal Inc. Grooving and cut-off tool. 3,646,649, Cl. 29-96.
Obata, Yoshiyuki, to Mitsubishi Denki Kabushiki Kaisha. Device for deicing rails. 3,648,017, Cl. 219-213.
Obermeyer, James Henry: *See—*
Brown, Fred; and Obermeyer, James Henry,3,647,251.
Ocean Systems, Incorporated: *See—*
Hettinger, Frederic Lee; and Gilman, Bruce Calvin, 3,647,253.
O'Connell, Gerald A.: *See—*
Burkart, Joseph A.; and O'Connell, Gerald A.,3,647,220.
Ogi, Hideo; Ozaki, Haruo; Mishiro, Masaru; Horikawa, Yoshikazu; and Mori, Shunji, to Nippon Steel Corporation. Method of cooling molds. 3,646,772, Cl. 62-62.
Ogilvie, LeRoy Francis: *See—*
Hensch, Earl John; and Ogilvie, LeRoy Francis,3,647,101.
Ogura, Haruo. Aminoalcohol derivatives. 3,647,859, Cl. 260-473.
Ohe, Keitaro; Nishio, Daijiro; and Sadamatsu, Shigeru, to Fuji Photo Film Co., Ltd.Suspension polymerization in the presence of α methyl styrene. 3,647,773, Cl. 260-88.7
Ohlin, Bror Eric Gustav, to Aktiebolaget Electrolux. Storage rack. 3,647,079, Cl. 211-176.
Ohnuma, Kiyoshi: *See—*
Kubo, Seitoku; Ohnuma, Kiyoshi; and Hirosawa, Koichiro,3,646,836.
Ohrui, Tetsuya; and Sakakibara, Yasuhito, to Sumitomo Chemical Company, Ltd. Method for producing concentrated nitric acid. 3,647,376, Cl. 23-160.
Oishi, Kenzaburo; and Toyozumi, Osamu, to Toyoda Koki Kabushiki Kaisha. Mounting adapter assembly. 3,646,711, Cl. 51-168.
Oishi, Naoaki: *See—*
Yano, Tomosaburo; Oishi, Naoaki; Komatsu, Akitoshi; and Koyama, Keizi,3,647,415.
Okada, Takaaki, to Kabushiki Kaisha Koparu. Device for indicating interruption of electrical service. 3,648,103, Cl. 315-136.
Okada, Toru; and Takatori, Toshimitsu, to NGK Insulators, Ltd. Jumper assembly connecting together two power line conductor sections. 3,647,933, Cl. 174-43.
Okamoto, Kazuo; Eguchi, Naoki; Sakao, Nasuo; Honda, Ichiro; and Suzuki, Eizo, to Nippon Steel Corporation, and Suzuki Metal Indus-

try Co., Ltd. Process for manufacturing alloy steel wires having low relaxation characteristics. 3,647,571, Cl. 148-12.3

Okaya, Takuji; and Miyazaki, Hirotoshi, to Kurashiki Rayon Co., Ltd. Process for the preparation of graftcopolymers of acetalized polyvinyl alcohol with methyl methacrylate. 3,647,756, Cl. 260-73.

Oke, Syoichi; and Kobayashi, Takanori, to Mitsubishi Electric Corporation. Apparatus for stopping a rotatably-driven machine at a predetermined position. 3,647,039, Cl. 192-146.

Okubo, Howard S.: *See—*
Albertson, Clarence E.; and Okubo, Howard S.,3,647,722.

Olde, Jarl Rune. Water feeding device. 3,646,955, Cl. 137-382.

Olin Corporation: *See—*
Saeman, Walter C., 3,647,365.

Olin Mathieson Chemical Corporation: *See—*
Ford, James A.; Saunders, Stuart R.; Caule, Elmer J.; and McLain, Charles D., 3,646,946.

Olivetti, Ing. C., & C., S.p.A.: *See—*
Garetto, Bruno, 3,647,043.
Serracchioli, Francesco; and Bartocci, Antonio, 3,648,251.

Olsen, Gerald N.: *See—*
Connett, Donald C.; Olsen, Gerald N.; and Lonnemo, Kurt R.,3,646,959.

Olson, Carl R.: *See—*
Hartlein, Robert C.; and Olson, Carl R.,3,647,846.

Olson, James R., to Eastman Kodak Company. Uniform polarity resin electrostatic toners. 3,647,696, Cl. 252-62.1

Olson, Kermit E.: *See—*
Chari, Nallan C. S.; Olson, Kermit E.; and Shick, Philip E.,3,647,363.

Olson, Roger A., to Buckbee-Mears Company. Method of making mirror-like finishes on metal masters. 3,647,642, Cl. 204-11.

Olympia Werke AG: *See—*
Bettin, Hubertus, 3,648,102.

Olympus Optical Co., Ltd.: *See—*
Ikeda, Yoshitsugi, 3,647,281.
Taira, Akio, 3,647,282.

Omark-Winslow Aerospace Tool Co.: *See—*
Sheffer, Ralph L., Jr., 3,646,660.

Omori, Tairiku: *See—*
Yamamoto, Atsushi; Omori, Tairiku; and Yasui, Hiroshi,3,647,629.

Omron Tateisi Electronics Co.: *See—*
Tateisi, Kazuma; Mizuta, Yukio; and Shizuya, Kyoto, 3,648,020.
Yamamoto, Mititake; Uekusa, Genzo; Tanimura, Shigeru; and Maejima, Norio, 3,648,117.

Ono, Hiroshi; and Higuchi, Toshikazu, to Daikin Kogyo Co., Ltd. Fluorine substituted benzyl dithiocarbamates and their production and use. 3,647,850, Cl. 260-455.

Ono, Hisatake; Watarai, Syu; and Katsuyama, Harumi, to Fuji Photo Film Co., Ltd. Photoconductive material for electrophotography. 3,647,428, Cl. 96-1.5

Ono, Shigeo, to Nippon Kogaku K.K. Film wind-up device for cameras provided with a focal plane shutter. 3,646,867, Cl. 95-31.

Ono, Toshiyuki: *See—*
Kawato, Tomoyoshi; Kusakabe, Takashi; and Ono, Toshiyuki,3,648,008.

Ontario Paper Company Limited, The: *See—*
Bulat, John Ivan; and Jaun, Rudolph, 3,647,092.

Opie, Joseph W.: *See—*
Speech, Steven R.; Opie, Joseph W.; and Bridge, John A.,3,647,472.

Oppermann, Willi; Schonitz, Egon; and Wagner, Werner, to DEMAG Aktiengesellschaft. Device for the continuous longitudinal seam welding of tubes. 3,648,007, Cl. 219-59.

Optronics International: *See—*
Ward, John H., 3,647,275.

Ordemann, Fred A., Jr.: *See—*
Beausoleil, William F.; Ordemann, Fred A., Jr.; Pricer, Wilbur D.; and Vogl, Norbert G., Jr.,3,648,255.

Orenstein & Koppel Aktiengesellschaft: *See—*
Althaus, Ernst, 3,647,270.

Orenstein-Koppel und Lubecker Maschinenbau A.G.: *See—*
Engelbart, Fritz, 3,647,081.

Orstam, Preben Einar Roar, to Skandinavisk Emballage Aktieselskab. By-pass for production lines. 3,647,044, Cl. 198-31.

Osdor, Asriel, to Hydro Chemical & Mineral Corporation. Ascending multi-stage distillation apparatus and method utilizing a feed-liquid-lift system. 3,647,638, Cl. 203-11.

Osterink, Larry M.: *See—*
Foster, Jack D.; and Osterink, Larry M.,3,648,193.

Osterman, Sven Olof, to Astra Nutrition Aktiebolag. Apparatus for counter-current heat treatment of biological tissue. 3,646,688, Cl. 34-168.

Ostler, David S.: *See—*
Holbrook, Le Grand K.; and Ostler, David S.,3,646,935.

Ostroff, Aaron J.: *See—*
Howell, William E.; and Ostroff, Aaron J.,3,647,276.

Ota, Akira: *See—*
Watanabe, Jun; Hosoi, Susumu; Kuwazaki, Masahiro; Ota, Akira; Takata, Toshikatsu; and Asaoka, Junichi,3,647,552.

Ota, Hiroshi: *See—*
Tanaka, Eihachiro; Fukuda, Takeji; Yamaji, Kenkichi; Miyake, Yasuhiko; Ota, Hiroshi; and Kimura, Katsuo,3,646,796.

Ota, Tazuo: *See—*
Tsuboi, Yukio; Ueda, Yoshio; Ota, Tazuo; and Yoneoka, Mikio,3,647,054.

Otis Engineering Corporation: *See—*
Pearce, Joseph L., Jr., 3,646,996.

Ott, Hans: *See—*
Petrzilka, Theodor; Hofmann, Albert; Schenk, Hansruedi; Troxler, Franz; Frey, Albert; and Ott, Hans,3,647,801.

Ott, Willy: *See—*
Ahlgrim, Michael; Kandler, Joachim; Lenz, Hans-Joachim; Mietens, Gerhard; and Ott, Willy,3,647,514.

Otten, Walter; Postma, Gosse Jan; Rietveld, Jan Joost; and Wolber, Jorg, to U.S. Philips Corporation. Circuit arrangement in a display device for producing a line-frequency sawtooth current having an amplitude which varies at the frame frequency. 3,648,099, Cl. 315-27.

Outboard Marine Corporation: *See—*
Dahl, Einar S., 3,646,739.
Wick, Gerald H.; and Holtermann, Theodore J., 3,647,024.

Overley, Richard Dean: *See—*
Chapman, Douglas W.; Overley, Richard Dean; Rands, Robert D., Jr.; and Schreiber, Ronald S.,3,647,492.

Overway, Roy E., to Sealed Power Corporation. Machine for forming piston ring spacer-expanders from strip stock. 3,646,797, Cl. 72-326.

Ovitron Corporation: *See—*
Jaeger, Walter, 3,647,360.

Ovshinsky, Stanford R.: *See—*
Fleming, Gordon R.; and Ovshinsky, Stanford R.,3,647,664.

Owatonna Manufacturing Company, Inc.: *See—*
Baumgartner, Darrell E., 3,647,011.

Owens, Abner, Jr.; and Yurasek, John F., to Bendix Corporation, The. Method and means for providing a synthetic real world runway centerline display. 3,648,231, Cl. 340-27.

Owens-Illinois, Inc.: *See—*
Chari, Nallan C. S.; Olson, Kermit E.; and Shick, Philip E., 3,647,363.
Gagnon, Donald W.; and Tillman, James J., 3,647,510.
Heaton, Richard A.; and Sachs, Maurice J., 3,647,410.
Mc Coll, Bruce John, 3,646,976.
Pirooz, Perry P., 3,647,490.

Oxygen Valve Company of America: *See—*
Swartz, Leonard B., 3,646,965.

Ozaki, Haruo: *See—*
Ogi, Hideo; Ozaki, Haruo; Mishiro, Masaru; Horikawa, Yoshikazu; and Mori, Shunji,3,646,772.

Ozawa, Yoshiko: *See—*
Suzuki, Hideo; Ozawa, Yoshiko; and Tanabe, Osamu,3,647,625.

Packaging Industries, Inc.: *See—*
Brown, Fred P., Jr., 3,647,335.

Paillard S.A.: *See—*
Ramet, Gilbert, 3,646,871.

Palfi, Thomas L.: *See—*
Castrucci, Paul P.; Grochowski, Edward G.; North, William D.; and Palfi, Thomas L.,3,648,130.

Palmason, Einar H.; and Stevens, Harry R., to Parkson Corporation. Automatic broiling apparatus. 3,646,879, Cl. 99-339.

Palmer, Jay W., to Morton-Norwich Products, Inc., mesne. Use of sodium chloride in providing aqueous solutions of copper salts from copper ore. 3,647,368, Cl. 23-97.

Palopoli, Frank P.; Blohm, Thomas R.; and Kariya, Takashi, to Richardson-Merrell Inc. Aminoalkoxy-triphenyl ethylenes and the salts thereof. 3,647,863, Cl. 260-501.18

Palumbo, Pete, to United States Steel Corporation. Apparatus for and method of collecting smoke from coke ovens during charging. 3,647,053, Cl. 201-1.

Pamplin, John W., to Marshall Richards Barcro Limited. Wire handling apparatus. 3,647,154, Cl. 242-83.

Paolucci, Julius J.: *See—*
Ross, Louis E.; Lyon, John K.; and Paolucci, Julius J.,3,646,967.

Paradan, Henri: *See—*
Bonnerot, Jacques; and Paradan, Henri,3,646,775.

Pargeter, John K.; and Diran, Loris M., to International Nickel Company, Inc., The. Nickel recovery. 3,647,419, Cl. 75-82.

Parke, Davis & Company: *See—*
Elslager, Edward F., 3,647,796.

Parker, Bernard, to Contraves AG, mesne. Conductivity cell for particle counting system. 3,648,158, Cl. 324-30.

Parker, Eddie R. Roofing clip. 3,646,717, Cl. 52-548.

Parker Hannifin Corporation: *See—*
Schmaus, Robert Leslie, 3,647,332.

Parker, Leslie Kearton, to Perkin-Elmer Limited. Quiet slot scanning. 3,648,156, Cl. 324-0.5

Parker-Hannifin Corporation: *See—*
Green, Kelvin D., 3,646,662.
Startman, Paul E., 3,646,964.

Parkinson, Richard Grant; and Griffin, James Richard, to American Standard Inc. Swivel spray apparatus. 3,647,144, Cl. 239-456.

Parkson Corporation: *See—*
Palmason, Einar H.; and Stevens, Harry R., 3,646,879.

Parson, Charles G.: *See—*
Horvath, Roland J.; and Parson, Charles G.,3,647,523.

Parsons, Charles L. Sorghum seed holder bird feeder. 3,646,911, Cl. 119-51.

Partridge, Graham: *See—*
McMillan, Peter William; and Partridge, Graham,3,647,489.

Pascale, John V.: *See—*
Brodnitz, Michael H.; and Pascale, John V.,3,647,481.

Paterson, Laurence O., to Drug Research, Inc. N-Bromo-N-chloro-sulfamyl benzoic acids and salts thereof. 3,647,836, Cl. 260-429.7

Patterson, Donald S., to Sargent Industries, Inc. Assembly adapted for use with ball screw actuator. 3,646,827, Cl. 74-424.8

Patterson, John F.: *See—*
Andrews, Harry N.; Patterson, John F.; and Wilson, John F.,3,647,622.

Patterson, Robert E.; and Walker, John L., Sr., to Walker, Johnnie Medical Electronics, Inc. Automatic physiological recording and alarm system for hospitals. 3,646,930, Cl. 128-2.06

Paull, Melvin. Surveillance and alarm system. 3,648,268, Cl. 340-276.

Paulsen, Glen E., to T. O. Plastics. Depth finding device. 3,646,684, Cl. 33-126.5

Pavelle Corporation, The: *See—*
Long, John Geoffrey, 3,647,296.

Pawsat, Carlton P.; and Humlong, Robert F., to Wald Manufacturing Company, Incorporated. Adjustable support for kickstand. 3,647,242, Cl. 280-298.

Paya Rico, Raimundo. Spring-operated driving mechanism for toy micro- vehicles. 3,647,025, Cl. 185-39.

Payk, Heinz: *See—*
Kipp, Adolf; and Payk, Heinz,3,646,799.

Pearce, Joseph L., Jr., to Otis Engineering Corporation. Well tools. 3,646,996, Cl. 166-212.

Pearlman, Marshall B.: *See—*
Chang, Richard S.; Cutler, Stanley; La Branche, Harvey W.; Pearlman, Marshall B.; Ryan, John W.; and Toy, Raymond M.,3,647,927.

Peck, Thomas W., to Powers Manufacturing, Inc. Centrifugal filter. 3,646,724, Cl. 55-274.

Pehrsson, Anders Lennart; and Andersson, Sven-Ola, to Aktiebolaget Karlstads Mekaniska Werkstad. Hollow blade for propellers and method of making it. 3,647,318, Cl. 416-233.

Peltzer, Douglas L., to Fairchild Camera and Instruments Corporation. Method of fabricating integrated circuits with oxidized isolation and the resulting structure. 3,648,125, Cl. 317-235.

Pendleton, John F.: *See—*
Schlott, Richard J.; Hoeg, Donald F.; and Pendleton, John F.,3,647,803.

Penkava, Jiri: *See—*
Kadera, Vaclav; Novotny, Josef; Vondruska, Miloslav; Feierfeil, Jiri; Svoboda, Vlastimil; Misarek, Dusan; Futera, Miroslav; Nacovska, Katerina; Janc, Zbynek; Nemec, Adolf; Penkava, Jiri; and Vitkovec, Zdenek,3,647,312.

Pentith, Gerald R. O., to Greenside Machine Company, Limited. Cutting heads. 3,647,265, Cl. 299-90.

Pepperhoff, Werner: *See—*
Fiedler, Alfred; and Pepperhoff, Werner,3,647,575.

Perkin-Elmer Corporation, The: *See—*
Bushman, Bliss M.; and Whistler, Wayne J., 3,648,047.

Perkin-Elmer Limited: *See—*
Parker, Leslie Kearton, 3,648,156.

Perkins, Merlyn H.: *See—*
Barnard, John D.; Gaito, Carl C.; Giedo, Gary R.; Greene, Thomas G.; Lind, James W.; Perkins, Merlyn H.; and Pross, Charles M.,3,648,175.

Perl, Richard L., to Tappan Company, The. Gas smooth top range. 3,646,927, Cl. 126-39.

Perrett, Brian Raymond, to British Aircraft Corporation Limited. Apparatus for signalling angular displacement. 3,648,042, Cl. 235-189.

Perrone, George L.: *See—*
Norman, Leslie W.; Hunter, Skillman C.; and Perrone, George L.,3,646,761.

Perrot, Alexander; and Schucker, Emil, to Perrot-Regnerbau GmbH & Co. Sprinkler construction. 3,647,140, Cl. 239-242.

Perrot-Regnerbau GmbH & Co.: *See—*
Perrot, Alexander; and Schucker, Emil, 3,647,140.

Perry, Adolphus R., to Bendix Corporation, The. Control system for vehicles. 3,648,228, Cl. 340-23.

Perstorp AB: *See—*
Sunden, Nils B., 3,647,595.

Peterson, Earl C. Sewage treatment. 3,647,667, Cl. 204-299.

Peterson, Fred D., to Peterson Products of San Mateo Inc. Jet engine cowl cover. 3,646,980, Cl. 150-52.

Peterson, Hold Le Roy: *See—*
Ball, Henry; and Peterson, Hold Le Roy,3,647,952.

Peterson Products of San Mateo Inc.: *See—*
Peterson, Fred D., 3,646,980.

Petrolite Corporation: *See—*
Annand, Robert R.; Redmore, Derek; and Rushton, Brian M., 3,647,711.

Petrzilka, Theodor; Hofmann, Albert; Schenk, Hansruedi; Troxler, Franz; Frey, Albert; and Ott, Hans, to Sandoz Ltd., a/k/a Sandoz A.G. Therapeutically active 10-methoxy-deserpidine. 3,647,801, Cl. 260-287.

Pett, Edgar A.: *See—*
Marshall, Douglas Woodworth; and Pett, Edgar A.,3,646,713.

Pettibone Corporation: *See—*
Carriere, Russell F., 3,647,099.
Stepanek, Roy W., 3,647,150.

Pfaff, Wayne K. Article packaging and handling chain. 3,647,055, Cl. 206-1.

Pfaffenbach, Arthur, to McGraw-Edison Company. Portable thermal fogger. 3,646,701, Cl. 43-129.

Pfaffenberger, Eugene E., to FMC Corporation. Cylindrical roller bearing cage. 3,647,273, Cl. 308-217.

Pfeiffer, Peter-Michael, to REFEKA Reklame-, Fest- und Karnevals-Artikelfabrik GmbH. Article of decoration. 3,646,695, Cl. 40-39.

Pfizer, Chas., & Co., Inc.: *See—*
Pirie, Donald K., 3,647,783.

Pfizer Inc.: *See—*
Beereboom, John J.; Cameron, Donald P.; and Stephens, Charles R., 3,647,479.

Pfluger, Gerhard: *See—*
Vogel, Erich; Ulimann, Gunter; and Pfluger, Gerhard,3,646,820.

Phelan, Louis A. M.: *See—*
Werner, Bernfried M., 3,646,774.

Phelps, Jerry A.; and Sass, Donald J. Portable battery-powered instrument for visualizing the peripheral pulse waveform and pulse rate. 3,646,931, Cl. 128-2.05

Phelps, Robert J.: *See—*
Fitzsimons, Alan R.; and Phelps, Robert J.,3,647,983.

Phibbs, William Wayne. Power operated pulling implement. 3,647,185, Cl. 254-30.

Phillips Petroleum Company: *See—*
Chapman, Charles C., 3,647,905.
Hann, Paul D., 3,647,330.
Voss, Raymond G.; and Ramsay, Ray D., 3,647,597.

Phillips, Walt, to Commodity Improvements Inc. K_2ZrF_6. 3,647,700, Cl. 252-89.

Philofsky, Elliott M.; and Ritchie, Kim, to Motorola, Inc. Intermetallic passivation of aluminum metallization. 3,647,935, Cl. 174-68.5

Philossky, Harold M.: *See—*
Heller, Paul R.; Brenner, William C.; and Philossky, Harold M.,3,647,932.

Pickett, Oscar A., Jr.: *See—*
Ridgway, James S.; and Pickett, Oscar A., Jr.,3,647,761.

Picquendar, Jean-Edgar: *See—*
Cahen, Olivier; Picquendar, Jean-Edgar; and Pircher, Georges,3,648,048.

Piepers, Gijsbrecht G.; Vons, Leonard H.; Van Der Linde, Aart; and Lijbrink, Eduard, to Reactor Centrum Nederland. Spacer grid respectively plate spring for a bunch of cylindrical elements taking part in a heat-exchanging-process. 3,646,994, Cl. 165-69.

Pierce, Joe T.: *See—*
Gruczelak, Norman P.; and Pierce, Joe T.,3,648,264.

Pierce, Ogden R.: *See—*
Loree, Lorne A.; Pierce, Ogden R.; and Kim, Yung Ki,3,647,740.

Pijpers, Emanuel M. J.: *See—*
Bonnema, Jentje; and Pijpers, Emanuel M. J.,3,647,754.

Pilch, Horst: *See—*
Gresch, Walter; Pilch, Horst; and Ruttener, Erwin,3,647,493.

Pilkington Brothers Limited: *See—*
Dickinson, George A., 3,647,408.
Robinson, Albert Sidney, 3,647,407.

Pinner, Champ D.; Sligh, Cecil E.; Diehl, James J.; and Garland, Wade H., Jr., to Sonoco Products Company. Electrical ground apparatus for testing the quality of conductors. 3,648,163, Cl. 324-51.

Pintard, Frederick Bruce; and Mollick, George Michael, to Johns-Manville Corporation. Tubular connector for expansion joints. 3,647,247, Cl. 285-229.

Pipala, Dennis R., to Symons Corporation. Concrete ceiling slab form installation and dome- supporting shore assembly therefor. 3,647,173, Cl. 249-31.

Pippin, Reginald F., Jr. Propelled toy arrangement. 3,646,702, Cl. 46-74.

Pircher, Georges: *See—*
Cahen, Olivier; Picquendar, Jean-Edgar; and Pircher, Georges,3,648,048.

Pirie, Donald K., to Pfizer, Chas., & Co., Inc. (2-Substituted-5-oxo-cyclopent-1-enyl)esters of α-carboxyarylmethyl penicillins. 3,647,783, Cl. 260-239.1

Pirooz, Perry P., to Owens-Illinois, Inc. Opalizable borosilicate glass compositions. 3,647,490, Cl. 106-54.

P. J. Endenburg's Zeilmakerij en Scheepstuigerij N.V.: *See—*
Van Der Molen, Leonard Hendrik, 3,647,172.

Placements Jean Paul Tanguay Limitee: *See—*
Tanguay, Jean-Paul; and Elie, De Roberval, 3,647,046.

Platus, David L. Energy absorbing arrangement. 3,647,028, Cl. 188-1.

Pleass, Charles M., to Bell Telephone Laboratories, Incorporated. Method for making electrooptic dipoles. 3,647,537, Cl. 117-227.

Plempel, Manfred: *See—*
Draber, Wilfried; Buchel, Karl Heinz; and Plempel, Manfred,3,647,816.

Plessinger, John A. Steering bar brake actuating device. 3,647,015, Cl. 180-27.

Ploch, Siegfried: *See—*
Scholtis, Walter; Ploch, Siegfried; Schattauer, Friedrich; Schonfuss, Martin; and Heilmann, Horst,3,646,781.

Plume, Alfred, Jr., to Mallory Electric Corporation. Breakerless ignition system. 3,646,926, Cl. 123-148.

Pocaterra, Luis Alberto. Mechanical transmission system. 3,646,822, Cl. 74-53.

Poferl, Gunter: *See—*
Truppe, Meinhard; Schernthaner, Matthias; and Poferl, Gunter,3,647,559.
Truppe, Meinhard; Schernthaner, Matthias; and Poferl, Gunter,3,647,560.
Polaroid Corporation: *See—*
Bachelder, Albert J., 3,647,441.
Biber, Conrad H., 3,646,865.
Land, Edwin H., 3,647,434.
Land, Edwin H., 3,647,435.
Land, Edwin H., 3,647,437.
Makas, Albert S., 3,647,278.
Malster, Robert L., 3,647,442.
Pollard, Thomas, to Gullick Limited. Mine roof support. 3,646,769, Cl. 61-45.
Polymer Corporaion Limited: *See—*
Lasis, Evalds, 3,647,913.
Pommer, Denis L.: *See—*
Hasten, Mark; Jones, Lee S.; and Pommer, Denis L.,3,646,894.
Pond, Robert B., to Atom Manufacturing Company. Take-apart fish hook or lure support. 3,646,700, Cl. 43-42.74
Pope, Kenneth W., to Du Pont of Canada Limited, mesne. Prefabricated building panel. 3,646,715, Cl. 52-309.
Porsche, Ferdinand Anton Ernst; and Srock, Rainer, to Porsche, Ing. h.c.F., Dr., K.G., Firma. Passenger car with a roll yoke. 3,647,258, Cl. 296-102.
Porsche, Ing. h.c.F., Dr., K.G., Firma: *See—*
Porsche, Ferdinand Anton Ernst; and Srock, Rainer, 3,647,258.
Porter, John Norman: *See—*
McGahren, William James; Porter, John Norman; and Korshalla, Joseph Daniel,3,647,776.
Poss, Richard F.: *See—*
Gower, Bob G.; and Poss, Richard F.,3,647,732.
Posson, Philip Lynn; Moore, Donald Baker; and Nicholson, Dallas Earl, to Explosive Technology, Inc. Aerodynamic directional grenade, launcher therefor and weapons system utilizing the same. 3,646,888, Cl. 102-67.
Postma, Gosse Jan: *See—*
Otten, Walter; Postma, Gosse Jan; Rietveld, Jan Joost; and Wolber, Jorg,3,648,099.
Potoski, John R.; and Freed, Meier E., to American Home Products Corporation. Quinoxalinyl-oxazolidines and -oxazines. 3,647,790, Cl. 260-244.
Potter, Roderick B., to Kelley Company, Inc. Hold-down mechanism for the ramp of a dockboard. 3,646,627, Cl. 14-71.
Potts, John T.; Lange, Lawrence H.; and Liss, Thomas P., to Galigher Company, The. Flotation machine and system utilizing impeller-type aeration units. 3,647,066, Cl. 209-169.
Powell, Anthony Charles: *See—*
King, George; Rayner, John lilliam Frederick; and Powell, Anthony Charles,3,647,535.
Powell, Charles Perry, to North American Rockwell Corporation. Bobbin selector device. 3,647,065, Cl. 209-88.
Powers Manufacturing, Inc.: *See—*
Peck, Thomas W., 3,646,724.
PPG Industries, Inc.: *See—*
Bartlett, Ronald S., 3,647,839.
Carlson, Gordon A., 3,647,653.
Doerge, Herman P.; and Wismer, Marco, 3,647,724.
Dowbenko, Rostyslaw; and Christenson, Roger M., 3,647,737.
Farmer, Alonzo; and Bogdan, John R., 3,647,383.
Kearley, Robert A., 3,647,370.
Precept, Incorporated: *See—*
Tims, Jerry L.; and Hubbard, Vance M., 3,648,109.
Precision Instrument Company: *See—*
Yarrington, Alfred R., 3,648,238.
Premium Forest Products Limited: *See—*
Stermac, Boris, 3,646,635.
Pressman, Gerald L.; and Kittredge, Thomas D., to Electroprint, Inc., mesne. Apparatus for aperture controlled electrostatic image reproduction or constitution. 3,647,291, Cl. 355-3.
Prestininzi, Pete: *See—*
Macey, James G., 3,647,367.
Prevot, Rene, to Eastman Kodak Company. Process for applying a magnetic track directly on an anti-halation backing of a cinematographic film. 3,647,541, Cl. 117-239.
Price-Pfister Brass Mfg. Co.: *See—*
Rokitenetz, Walter, 3,646,619.
Price-Plister Brass Mfg. Co.: *See—*
Ross, Louis E.; Lyon, John K.; and Paolucci, Julius J., 3,646,967.
Pricer, Wilbur D.: *See—*
Beausoleil, William F.; Ordemann, Fred A., Jr.; Pricer, Wilbur D.; and Vogl, Norbert G., Jr.,3,648,255.
Priede, Bruno Andreevich: *See—*
Berzin, Gunard Valdemarovich; Kalnin, Arvid Yanovich; Sushkov, Alexandr Fedorovich; Skrupsky, Voldemar Petrovich; Ziemelis, Andris Eduardovich; Soloviev, Boris Fedorovich; Leeniex, Karl Mikhailovich; Sovetin, Vladimir Kirilovich; Gulbis, Yan Karlovich; Dalbinsh, Yan Yanovich; Priede, Bruno Andreevich; Upman, Karl Kristapovich; Muzhits, Vitold Iosifovich; Junga, Yan Petrovich; Krogzem, Ivar Arnoldovich; Greitan, Zigurd Boleslavovich; and Rotsen, Karl Arturovich,3,646,687.
Pritzker, Jay A.: *See—*
Doppelt, Max J.,3,646,941.
Process for the preparation of etherified: *See—*
Chemische Werke Albert, 3,647,755.
Procter & Gamble Company, The: *See—*
Franks, Neal E.; and Franks, Neal E., 3,647,630.
Franks, Neal E.; and Franks, Neal E., 3,647,630.
Gellert, Dale A., 3,646,937.
Procter and Gamble Company, The: *See—*
Morgan, John W., 3,647,857.
Properzi, Ilario. Apparatus for a multi-head rolling unit arranged to enable the rapid removal and replacement of said unit. 3,646,790, Cl. 72-43.
Pross, Charles M.: *See—*
Barnard, John D.; Gaito, Carl C.; Giedo, Gary R.; Greene, Thomas G.; Lind, James W.; Perkins, Merlyn H.; and Pross, Charles M.,3,648,175.
Prosser, David G., to Autotrol Corporation. Rotary power transmission. 3,646,819, Cl. 74-3.5
Provi, Mike A., to Rockford Iron Works Inc. Punch press with swing-out control panel. 3,646,883, Cl. 100-53.
Pruitt, Charles N.; Segars, Douglas L.; and Miller, Walter L., to Raybestos-Manhattan, Inc. Mold for manufacture of cored rubber rolls. 3,647,336, Cl. 425-146.
Pudark, Arthur A.: *See—*
Zahradnik, George J.; and Pudark, Arthur A.,3,647,288.
Pugnaire, Jean-Pierre A., to Bytrex, Inc. Adjustable transducer overload stop. 3,646,809, Cl. 73-141.
Pullman Incorporated: *See—*
Ferris, Ray L.; and Spence, John H., 3,647,248.
Pupo, David A.: *See—*
Haist, Grant M.; King, James R.; and Pupo, David A.,3,647,453.
Purdy, Don Ryall; and Donnelly, William Edward, to RCA Corporation. Fluid cooled apparatus for testing power semiconductor devices. 3,648,167, Cl. 324-158.
Purex Corporation, Ltd.: *See—*
Schiller, Teddy M., 3,647,167.
Purland, Donald A.; and Gustafson, Alan M., to Detection Sciences, Inc. Digital timing system. 3,646,751, Cl. 58-152.
Purolator Products, Inc.: *See—*
Hammer, Kurt F., 3,646,906.
Putnam, David T.; and Tatum, William C., to International Business Machines Corporation. Method for locating printed circuit work piece. 3,647,582, Cl. 156-3.
Qualich, Amedeo, to Stromberg-Carlson Corporation. Method of making a plated wire memory using a sheet of film adhesive. 3,646,668, Cl. 29-604.
Qualitrol Corporation: *See—*
Romanowski, Robert F., 3,646,970.
Queener, Carl A., to International Business Machines Corporation. Copying system featuring combined developing- cleaning station alternately activated. 3,647,293, Cl. 355-15.
Quintana, Pedro. Dust removing attachment device for power grinders. 3,646,712, Cl. 51-273.
Raabe, George A.: *See—*
Schlesinger, Robert J.; and Raabe, George A.,3,647,959.
Rabatin, Jacob G.: *See—*
Gillooly, George R.; and Rabatin, Jacob G.,3,647,707.
Rabens, Neil W.: *See—*
Foley, Charles F.; McCarthy, Charles D.; and Rabens, Neil W.,3,647,218.
Rabo, Jule Anton; Angell, Charles Leslie; and Skeels, Gary William, Jr., to Union Carbide Corporation. Olefin production by the catalytic treatment of hydrocarbons. 3,647,682, Cl. 208-120.
Rachel, Todd L., to Bendix Corporation, The. Cold start auxiliary circuit for electronic fuel control system. 3,646,915, Cl. 123-32.
Rachel, Todd L.: *See—*
Nagy, John R.; and Rachel, Todd L.,3,646,918.
Rachic, Joseph. Kick block. 3,647,240, Cl. 280-150.
Radiation Research Corporation: *See—*
Sargent, Donald E., 3,647,764.
Radin, Bernard G.: *See—*
Fitzsimons, William D.; and Radin, Bernard G.,3,647,016.
Radloff, Harry L.: *See—*
Seiferth, Oscar E.; Goller, Robert L.; Grindrod, Paul E.; and Radloff, Harry L.,3,647,485.
Radziwill, Anthony N.: *See—*
Moseley, John C.; Schaffer, Rupert E.; and Radziwill, Anthony N.,3,647,527.
Rafferty, Edson Howard; and Kletschka, Harold D. Electrically-driven pumps capable of use as heart pumps. 3,647,324, Cl. 417-420.
Rafferty, John E. Rescue device for linemen. 3,647,171, Cl. 248-221.
Ragard, Phillip A., to Universal Instruments Corporation. Lead cut and clinch mechanism. 3,646,659, Cl. 29-203.
Rainone, Nicholas J.: *See—*
De Caro, Aristide R.; and Rainone, Nicholas J.,3,648,094.
Ramet, Gilbert, to Paillard S.A. Diaphragm adjustment device for a motion picture camera. 3,646,871, Cl. 95-64.
Ramsay, Ray D.: *See—*
Voss, Raymond G.; and Ramsay, Ray D.,3,647,597.
Randolph, August: *See—*
Huckstadt, Harald; Saleck, Wilhelm; Randolph, August; and Moll, Franz,3,647,469.
Rands, Robert D., Jr.: *See—*
Chapman, Douglas W.; Overley, Richard Dean; Rands, Robert D., Jr.; and Schreiber, Ronald S.,3,647,492.

Rasch, Arthur A., to Eastman Kodak Company. Photographic diffusion transfer product and process. 3,647,440, Cl. 96-29.

Rasquin, John R., to United States of America, National Aeronautics and Space Administration. High temperature furnace for melting materials in space. 3,647,924, Cl. 13-20.

Ratcliff, Henry K., to Bendix Corporation, The. Transistor power amplifier. 3,648,188, Cl. 330-26.

Ratcliffe, George Dennis. Simulated steering device having a manually controlled friction resistance to steering movements. 3,647,210, Cl. 272-83.

Rathjen, J. Fred; and Laermer, Lothar, to Singer Company, The. Electronic assembly having cooling means for stacked modules. 3,648,113, Cl. 317-109.

Rathjen, Theodore Nicholas; and Hanson, Harold Biddick, to Chemetron Corporation. Mold cover. 3,646,881, Cl. 99-351.

Raue, Roderich; Eifler, Willi; and Kuhlthau, Hans-Peter, to Farbenfabriken Bayer Aktiengesellschaft. Process for the dyeing and printing of shaped materials of polymers from acrylonitrile,. asdicyanoethylene or acid-modified aromatic esters. 3,647,349, Cl. 8-4.

Rauner, Frederick J.: *See—*
Gilson, Richard E.; and Rauner, Frederick J.,3,647,447.

Rauner, Frederick J.; Arcesi, Joseph A.; and Guild, John R., to Eastman Kodak Company. Light-seinone diazide polymers and polymer compositions. 3,647,443, Cl. 96-33.

Ravatt, Hugh M., 45% to Kreisheimer, John P. Golf practicing apparatus. 3,647,219, Cl. 273-185.

Ray-Chaudhuri, Dilip K.: *See—*
Stockmann, Hans H.; and Ray-Chaudhuri, Dilip K.,3,647,763.

Raybestos-Manhattan, Inc.: *See—*
Pruitt, Charles N.; Segars, Douglas L.; and Miller, Walter L., 3,647,336.

Rayburn, Charles C., to Illinois Tool Works Inc. Multi-layer capacitor and process for adjusting the value thereof. 3,648,132, Cl. 317-261.

Raymond International Inc.: *See—*
Hilton, Joseph Lawrence; Graff, Charles Russell; and Cavin, Lewis Fred, 3,646,766.

Rayner, John lilliam Frederick: *See—*
King, George; Rayner, John lilliam Frederick; and Powell, Anthony Charles,3,647,536.

Raytheon Company: *See—*
Toledo, Emil; and Sprague, Dennis R., 3,647,654.

RCA Corporation: *See—*
Anderson, George Edward, 3,647,944.
Ball, Henry; and Peterson, Hold Le Roy, 3,647,952.
Baugher, Dale Milton; and Hausman, Earl Thomas, 3,648,116.
Boleky, Edward Joseph; and Burns, Joseph Richard, 3,646,666.
Butler, Robert John, 3,647,965.
Graf, Stefano Arturo, 3,648,153.
Hannan, William James, 3,647,945.
Heiman, Frederic Paul, 3,647,438.
Juroff, Lyle Bruce; and Lunn, Lawrence Mark, 3,648,135.
Klein, Richard Ira; and Caplan, Sandor, 3,647,280.
Ladany, Ivan, 3,647,579.
Purdy, Don Ryall; and Donnelly, William Edward, 3,648,167.
Siekanowicz, Wieslaw Wojciech, 3,648,197.
Watson, James Power, 3,648,279.

Reactor Centrum Nederland: *See—*
Piepers, Gijsbrecht G.; Vons, Leonard H.; Van Der Linde, Aart; and Lijbrink, Eduard, 3,646,994.

Reader, Malcolm; Tregay, John L.; and Stern, Charles, to Comfax Communications Industries, Inc. Image transmitter using microfilm positives or negatives as source. 3,647,955, Cl. 178-7.6

Rector, Jacob. Resistance elements. 3,648,216, Cl. 338-142.

Redecker, Henry W.; and Zisa, William J., to Westinghouse Electric Corporation. Electrical device having current limiter and spark gap. 3,648,166, Cl. 324-110.

Redmond, William G.: *See—*
Koch, Werner G.; Marchell, Robert H.; and Redmond, William G.,3,646,754.

Redmore, Derek: *See—*
Annand, Robert R.; Redmore, Derek; and Rushton, Brian M.,3,647,711.

Reed, Madison W., Jr.; and Schwemer, Warren C., to Advanced Technology Center, Inc., mesne. Method of making a porous carbon material. 3,647,551, Cl. 136-122.

REFEKA Reklame-, Fest- und Karnevals-Artikelfabrik GmbH: *See—*
Pfeiffer, Peter-Michael, 3,646,695.

Regnier, Gilbert; Canevari, Roger; and Laubie, Michel, to Societe en nom Collectif 'Science Union et Cie,' Societe Francaise de Recherche Medicale. s-Triazine compounds. 3,647,794, Cl. 260-249.6

Reich, Robert W. Electronic clockwork drive. 3,646,750, Cl. 58-28.

Reichhold Chemicals, Inc.: *See—*
Chang, Yun Ger, 3,647,822.

Reid, Laurance S. Natural gas filter. 3,646,730, Cl. 55-302.

Reifenberg, Gerald H.; and Considine, William J., to M&T Chemicals Inc. Tricyclohexyltin halide process. 3,647,833, Cl. 260-429.7

Reifenhauser, Fritz; Reifenhauser, Hans; and Burggraf, Klaus, to Reifenhauser KG. Apparatus for the extrusion of cellular synthetic resins. 3,647,329, Cl. 425-4.

Reifenhauser, Hans: *See—*
Reifenhauser, Fritz; Reifenhauser, Hans; and Burggraf, Klaus,3,647,329.

Reifenhauser KG: *See—*
Reifenhauser, Fritz; Reifenhauser, Hans; and Burggraf, Klaus, 3,647,329.

Reilly, John F.: *See—*
Grant, Bernard Carrington; and Reilly, John F.,3,647,260.

Reisacher, Josef, to Diamler-Benz Aktiengesellschaft. Cooling water conductor system in reciprocating piston internal combustion engines. 3,646,919, Cl. 123-41.82

Reiter, Gabriel. Dental-prophylaxis composition. 3,647,381, Cl. 51-308.

Reiter, Jozsef: *See—*
Harsanyi, Kalman; Reiter, Jozsef; Korbonits, Dezso; Goeczi, Csaba; Takacs, Kalman; Bak[illegible], Erzsebet; Leszkovszky, Gyorgy; Tardos, Laszlo; and Vertesy, Csaba,3,647,809.

Renner, Charles F.; and Lipstein, Norman J., to General Electric Company. Starter generator construction. 3,648,086, Cl. 310-63.

Reno, Frederick, to Ford Motor Company. Vehicle accelerator linkage assembly. 3,646,829, Cl. 74-513.

Repay, Laszlo N.: *See—*
Lace, Melvin A.; and Repay, Laszlo N.,3,647,986.

Resnick, Harry: *See—*
Rosenweig, Ronald E.; and Resnick, Joseph,3,648,269.

Resnick, Joseph: *See—*
Rosenweig, Ronald E.; and Resnick, Joseph,3,648,269.

Restelli, Attilip, to Starck, Hermann C., Berlin. Process for producing high-purity niobium and tantalum. 3,647,420, Cl. 75-84.

Reynolds, Harold C., to Cooper Industries, Inc. Tool for applying and locking threaded fasteners. 3,646,837, Cl. 81-10.

Reynolds Metals Company: *See—*
Farquhar, Melville T., 3,647,058.
Hutcheson, James L., 3,646,726.

Reynolds, Rolfe E.; and Spencer, Louis L., to Textron Inc. Slide fastener presser foot. 3,646,899, Cl. 112-235.

Reynolds, Spencer E.: *See—*
Vozenilek, Theodore M., 3,647,994.

Rheinfrank, Lamson, Jr., to Standard-Havens, Inc. Inclined drag conveyor for hot asphalt mix and the like. 3,647,047, Cl. 198-174.

Rheinische Braunkohlewerke A.G.: *See—*
Wenzel, Werner; and Schenck, Hermann, 3,647,379.

Rhone-Poulenc S.A.: *See—*
Chabardes, Pierre; and Colevray, Louis, 3,647,832.

Rice, David E.: *See—*
Loudas, Basil L.; and Rice, David E.,3,647,891.

Rice, Hal H.; and Dudash, James J., to General Motors Corporation. Stabilized nickel oxide seal. 3,646,993, Cl. 165-9.

Rice, Rex: *See—*
Smith, William R.; Rice, Rex; and Mazor, Stanley,3,647,348.

Rice, Stanley B., Jr., to Texas Instruments, Incorporated. Preparation of welding surfaces on semiconductors. 3,647,534, Cl. 117-212.

Rich, James L.; and Weintraub, Marvin H., to Ford Motor Company. Friction material additives for improved performance. 3,647,744, Cl. 260-38.

Richard, Pierre, to Jap S.A. Method and tool for making a watch dial with raised symbols. 3,646,653, Cl. 29-177.

Richardson-Merrell Inc.: *See—*
Carr, Albert A.; Meyer, Donald R.; Carr, Albert A.; Meyer, Donald R.; and Klein, Georg Anton, 3,647,797.
Palopoli, Frank P.; Blohm, Thomas R.; and Kariya, Takashi, 3,647,863.
Sill, Arthur D.; and Fleming, Robert W., 3,647,860.

Richter, Ronald B.: *See—*
Eul, Edward A., Jr.; and Richter, Ronald B.,3,647,990.

Ricoh Co., Ltd.: *See—*
Hashimoto, Hideo, 3,647,206.
Hirafuji, Ban, 3,646,832.

Ridgway, James S.; and Pickett, Oscar A., Jr., to Monsanto Company. Polyamides of a C_{7-12} aliphatic dicarboxylic acid, terephthalic acid and an aliphatic diamine. 3,647,761, Cl. 260-78.

Ridgway, John A., Jr.: *See—*
Wolff, William F.; Rosscup, Robert J.; and Ridgway, John A., Jr.,3,647,677.

Ridings, Charles L.: *See—*
Langendorf, Matthew P.; and Ridings, Charles L.,3,647,985.

Riedl, Franz, to Vereinigte Flugtechnische Werke GmbH fruher 'Weser' Flugzeugbau/Focke-Wulf/Heinkel-Flugzeugbau. Cover arrangement. 3,647,166, Cl. 244-102.

Riehm, Theodor; and Gehrig, Oskar, to Benckiser-Knapsack GmbH. Process for continuously producing alkali metal phosphates. 3,647,369, Cl. 23-107.

Rieke, James K.; Behr, Douglas Raymond; and McIntire, Otis R., to Dow Chemical Company, The. Thin metal laminates. 3,647,617, Cl. 161-216.

Rietveld, Jan Joost: *See—*
Otten, Walter; Postma, Gosse Jan; Rietveld, Jan Joost; and Wolber, Jorg,3,648,099.

Riker Laboratories, Inc.: *See—*
Gerster, John F., 3,647,874.

Ripart, Guy Marie: *See—*
Denis, Andre Maxime Philippe; and Ripart, Guy Marie,3,648,157.

Ripplinger, Roland E., to Honeywell Information Systems Inc. Apparatus for measuring reverse recovery characteristics of diodes. 3,648,168, Cl. 324-158.

Rishovd, Sigurd A., to Royal Industries, Inc. Vehicle jack. 3,647,183, Cl. 254-2.

Ritchie, Kim: *See—*
Philofsky, Elliott M.; and Ritchie, Kim,3,647,935.
Rival Manufacturing Company: *See—*
Scott, Robert J.; and Aberer, Leo F., 3,646,671.
Rivera-Ortiz, Jose Manuel: *See—*
Cancel, Luis E.; Rivera-Ortiz, Jose Manuel; and Garcia-Rivera, Francisco,3,647,062.
Rixson Inc.: *See—*
Ellis, David H., 3,646,877.
Roben, Lucas Wilhelmus, to Elka Trust Reg. Clamping connection for curtains and the like. 3,646,641, Cl. 24-73.
Roberts, Earl J.; Rowland, Stanley P.; and Brannan, Mary Ann F., to United States of America, Agriculture. Chemical modification of fibrous cellulose with sodium N-methylbis (2-sulfatoethy) amine and with N-methylbis (2-chloroethyl) amine to impart crease resistance in fabrics. 3,647,352, Cl. 8-116.2
Robertshaw Controls Company: *See—*
Genbauffe, Francis Simon, 3,647,146.
Nurnberg, Richard K., 3,648,074.
Robinson, Albert Sidney, to Pilkington Brothers Limited. Method for the manufacture of float glass. 3,647,407, Cl. 65-30.
Robinson, Robert E.; and De Hoff, Ronald L., to Venderbilt, R. T., Company, Inc.Process for preparing a mixture of 4-methyl-Δ-tetrahydrophthalic anhydrides as a curing agent. 3,647,701, Cl. 252-182.
Rochelle, William R.; and Wycoff, Ronald Lee, to Brown & Root, Inc. Jacket pile clean-out apparatus. 3,646,947, Cl. 134-167.
Rockford Iron Works Inc.: *See—*
Provi, Mike A., 3,646,883.
Rockwell Manufacturing Company: *See—*
Sundby, Gustav B., 3,646,893.
Rodgers, Swain: *See—*
Spicer, Oliver V., 3,647,124.
Rogers, Adair. Radial flow check valve. 3,646,956, Cl. 137-525.
Rogers, Raymond R.: *See—*
Dingley, Wilfred; Bednar, John S.; and Rogers, Raymond R.,3,647,648.
Rogers, Waldo I., to Rusco Industries, Inc. Electronic validator system for magnetic credit cards and the like. 3,648,021, Cl. 235-61.7
Roggero, Arnaldo: *See—*
Cesca, Sebastiano; Roggero, Arnaldo; and Marconi, Walter,3,647,767.
Rohloff, Ebbe; and Lorenz, Richard, to Siemens Aktiengesellschaft. Teaching system for programmed class and individual teaching. 3,647,926, Cl. 35-48.
Rohm and Haas Company: *See—*
Bayer, Horst O.; Cook, Richard S.; and von Meyer, William C., 3,647,810.
Brodnyan, John G., 3,647,735.
Greenfield, Stanley A., 3,647,814.
Rohr Corporation: *See—*
Carrillo, Gilberto; and Brown, William D., 3,647,645.
MacDonald, Howard R., 3,647,020.
Millman, Victor; and Gray, Wallie P., 3,647,021.
Murday, David A., 3,647,141.
Schafer, Thomas W., 3,647,231.
Waidelich, Jack P., 3,646,760.
Rohr, Otto; and von Orelli, Marcus, to Ciba Limited. Trifluormethyl-p-nitro diphenyl ethers. 3,647,888, Cl. 260-612.
Rohraff, Harry E., Sr. Broken tool detector. 3,647,998, Cl. 200-61.42
Rokitenetz, Walter, to Price-Pfister Brass Mfg. Co. Lavatory pop-up waste valve. 3,646,619, Cl. 4-203.
Rolen, Hurschel H.: *See—*
Rollen, Wayne N.; Strong, Larry J.; and Rolen, Hurschel H.,3,648,146.
Rolf, Helmut, to International Standard Electric Corporation. Coil form. 3,648,208, Cl. 336-208.
Rollen, Wayne N.; Strong, Larry J.; and Rolen, Hurschel H. Alternator circuit protector. 3,648,146, Cl. 320-25.
Romani, Anthony R. Styling comb and method of making. 3,646,945, Cl. 132-11.
Romanowski, Robert F., to Qualitrol Corporation. Flow control unit for bellows controlled sudden pressure rise relay. 3,646,970, Cl. 138-46.
Rootes Motors Limited: *See—*
Litchfield, Edward Francis, 3,647,257.
Rosa, Albert G.: *See—*
Arrance, Frank C.; and Rosa, Albert G.,3,647,554.
Roscher, Gunter; and Schmitz, Heinz, to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning. Process for the manufacture of acetaldehyde from vinyl acetate. 3,647,882, Cl. 260-601.
Rose, Marshall G., Jr., to Ampex Corporation. Edit control for video tape record system. 3,647,951, Cl. 178-6.6
Rosemount Engineering Company: *See—*
De Leo, Richard V.; and Hagen, Floyd W., 3,646,811.
Rosen, Philip J., to Babcock & Wilcox Company, The. Stepping motor control system. 3,648,144, Cl. 318-696.
Rosenburgh, Norman J., to Eastman Kodak Company. Information carrier selection system. 3,647,064, Cl. 209-80.5
Rosenwald, Robert H., to Universal Oil Products Company. Distillation of styrene with addition of polymerization inhibitor. 3,647,637, Cl. 203-9.
Rosenweig, Ronald E.; and Resnick, Joseph, deceased0 (by Berger, Louis0Resnick, Harry0Messina, Peter; executors), to Ferrofluidics Corporation. Magnetic fluid display device. 3,648,269, Cl. 340-373.
Ross, John Sterry Hawley: *See—*
Macnab, Robert Beattie; Ross, John Sterry Hawley; and Wood, Michael Burke,3,648,082.
Ross, Louis E.; Lyon, John K.; and Paolucci, Julius J., to Price-Pfister Brass Mfg. Co. Diverter valve structure. 3,646,967, Cl. 137-625.47
Rosscup, Robert J.: *See—*
Wolff, William F.; Rosscup, Robert J.; and Ridgway, John A., Jr.,3,647,677.
Rossello, Mario: *See—*
Calligaris, Ennio; and Rossello, Mario,3,647,450.
Rossi, Alberto; and Sury, Ernst, to Aba Corporation. 2,3,4,4a,5,6-Hexahydro-1H-pyrazino[1,2-a] quinolines and pharmaceutical compositions containing same. 3,647,791, Cl. 260-268.
Rossi, Louis J., to Eastman Kodak Company. Substituted bis(p-dialkylaminophenyl) methane photoconductors. 3,647,431, Cl. 96-1.5
Rostad, Nels C.; and Davis, Walter J., to Lockheed Aircraft Corporation. Rotor blade pitch control by mechanical hydraulic system sensing blade deflection. 3,647,315, Cl. 416-31.
Roth, Donald T. Random indicating device. 3,648,274, Cl. 340-332.
Rotodyne Manufacturing Corporation: *See—*
Bavers, Elliott, 3,646,898.
Rotsen, Karl Arturovich: *See—*
Berzin, Gunard Valdemarovich; Kalnin, Arvid Yanovich; Sushkov, Alexandr Fedorovich; Skrupsky, Voldemar Petrovich; Ziemelis, Andris Eduardovich; Soloviev, Boris Fedorovich; Leeniex, Karl Mikhailovich; Sovetin, Vladimir Kirilovich; Gulbis, Yan Karlovich; Dalbinsh, Yan Yanovich; Priede, Bruno Andreevich; Upman, Karl Kristapovich; Muzhits, Vitold Iosifovich; Junga, Yan Petrovich; Krogzem, Ivar Arnoldovich; Greitan, Zigurd Boleslavovich; and Rotsen, Karl Arturovich,3,646,687.
Rott, Dennis A.; and Smiljanic, John P., to Western Electric Company, Incorporated. Masking compositions. 3,647,730, Cl. 260-23.
Rouse, Alan D.: *See—*
Nolting, Jerry L.; and Rouse, Alan D.,3,646,802.
Rowland, Stanley P.: *See—*
Roberts, Earl J.; Rowland, Stanley P.; and Brannan, Mary Ann F.,3,647,352.
Rowley, Daniel S., to Irvington Forest Industries, Inc. Clutch operated diverter for sorting system. 3,647,063, Cl. 209-74.
Rowley, Kermit G.; and Barron, Richard H., to Tenneco Oil Company. Method for controlling well blowouts. 3,647,000, Cl. 166-285.
Royal Industries, Inc.: *See—*
Rishovd, Sigurd A., 3,647,183.
Royka, Stephen F.: *See—*
Keller, Carol K.; Royka, Stephen F.; and Snelling, Christopher,3,647,659.
Rozman, George J., to Ashland Oil & Refining Company. Process for concentration and conversion of hydrocarbons. 3,647,900, Cl. 260-674.
Rubin, Harvey, to Bell Telephone Laboratories, Incorporated. Program store error detection arrangements for switching systems. 3,647,979, Cl. 179-18.
Rudd, Wallace C., to AMF Incorporated. Induction tube welding with improved current path. 3,648,005, Cl. 219-8.5
Rudin, Walter: *See—*
Brungraber, Louis E.; and Rudin, Walter,3,647,194.
Rumanowski, Edmund J., to Allied Chemical Corporation. Alkyl-N-alkyl-chlorophenoxythioacetimidates as selective herbicides. 3,647,413, Cl. 71-98.
Rupp, Hans-Dieter; and Magerlein, Helmut, to Glanzstoff AG. Production of 2,2'-bis-[1,3,4-thiadiazoline-5- thione]. 3,647,811, Cl. 260-302.
Ruppin, Dietrich: *See—*
Hertel, Heinrich; and Ruppin, Dietrich,3,646,792.
Rusca, Ralph A., to United States of America, Agriculture. Method and apparatus for bulking yarn. 3,646,744, Cl. 57-34.
Rusco Industries, Inc.: *See—*
Rogers, Waldo I., 3,648,021.
Rushmere, John Derek, to Du Pont de Nemours, E. I., and Company. Process for the manufacture of hydrogen cyanide. 3,647,388, Cl. 23-151.
Rushton, Brian M.: *See—*
Annand, Robert R.; Redmore, Derek; and Rushton, Brian M.,3,647,711.
Russell, Carl D., 5% to James, Crafton D., and James, Mary Lea. Remote control window cleaning device. 3,646,630, Cl. 15-302.
Russell, Edward J., to General Instrument Corporation. Beam lead bonding process. 3,647,644, Cl. 204-15.
Russell-French, Harry M., to Boothe Airside Services, Inc., mesne. Cargo container construction. 3,647,100, Cl. 220-1.5
Russell, James P.: *See—*
Hoffman, Joseph K.; and Russell, James P.,3,647,862.
Russell, Ronald W.: *See—*
Frederiksen, Thomas M.; and Russell, Ronald W.,3,648,154.
Russell, William H.: *See—*
Taber, Robert C.; and Russell, William H.,3,647,459.
Russo, Mario: *See—*
Mortillaro, Luigi; Russo, Mario; and Guidotti, Vincenzo,3,647,765.
Ruttener, Erwin: *See—*
Gresch, Walter; Pilch, Horst; and Ruttener, Erwin,3,647,493.

Ryan, John W.: *See—*
Chang, Richard S.; Cutler, Stanley; La Branche, Harvey W.; Pearlman, Marshall B.; Ryan, John W.; and Toy, Raymond M.,3,647,927.
Rychlewski, Thaddeus V.: *See—*
Andrade, Philip; and Rychlewski, Thaddeus V.,3,647,941.
Rydborn, Sten-Ake Olaus. Circuitry for connecting and disconnecting a load. 3,648,107, Cl. 315-360.
Ryffel, Kaspar; and Schneller, Heinz, to Inventa AG fur Forschung und Patentverwertung. Process and apparatus for the continuous production of polyamides and polyesters. 3,647,758, Cl. 260-75.
Rynbrandt, Ronald H.; and Skaletzky, Louis L., to Upjohn Company, The. Cycloalkanecarboxamides. 3,647,804, Cl. 260-293.63
Rytina, Anton W.: *See—*
Cole, William J.; and Rytina, Anton W.,3,646,909.
Sachs, Maurice J.: *See—*
Heaton, Richard A.; and Sachs, Maurice J.,3,647,410.
Sadagopan, Varadachari: *See—*
Lean, Eric G.; Sadagopan, Varadachari; and Tseng, Samuel C.-C.,3,648,081.
Sadamatsu, Shigeru: *See—*
Ohe, Keitaro; Nishio, Daijiro; and Sadamatsu, Shigeru,3,647,773.
Saeman, Walter C., to Olin Corporation. Coarse light sodium bicarbonate. 3,647,365, Cl. 23-64.
Sagami, Hiroyuki: *See—*
Sato, Takehiko; and Sagami, Hiroyuki,3,647,907.
Sahlgren, Rolf Ake; and Wiljanen, Bo Ingvar, to Telefonaktiebolaget LM Ericsson. Stepping device. 3,646,826, Cl. 74-142.
Sair, Louis, to Griffith Laboratories, Inc., The. Two-step method for producing sterlized ground spices. 3,647,487, Cl. 99-225.
Saito, Tadaomi: *See—*
Shimazaki, Hideo; Tsukamoto, Shuji; Saito, Tadaomi; Eguchi, Sadanari; and Komata, Yasushi,3,647,825.
Saito, Tsutomu: *See—*
Morita, Shichiro; Shimazu, Hiroshi; Saito, Tsutomu; Nakamura, Hiroshi; and Maeda, Torata,3,647,149.
Sakakibara, Yasuhito: *See—*
Ohrui, Tetsuya; and Sakakibara, Yasuhito,3,647,376.
Sakao, Nasuo: *See—*
Okamoto, Kazuo; Eguchi, Naoki; Sakao, Nasuo; Honda, Ichiro; and Suzuki, Eizo,3,647,571.
Sakurai, Masao; and Muto, Kikuo, to Gunze Kobunshi Kogyo Kabushiki Kaisha. Apparatus for manufacturing biaxially oriented film. 3,647,340, Cl. 425-326.
Saleck, Wilhelm: *See—*
Huckstadt, Harald; Saleck, Wilhelm; Randolph, August; and Moll, Franz,3,647,469.
Salmi, Victor John, III, to General Refractories Company. Preassembly of refractory brick and lining furnaces therewith. 3,646,722, Cl. 52-745.
Salyer, Ival O.; and Jefferson, Robert T., to United States of America, Atomic Energy Commission, mesne. Porous structure and method. 3,647,721, Cl. 260-2.5
Sambell, Ronald Alfred James: *See—*
Bowen, Dennis Herbert; Mattingley, Neville John; and Sambell, Ronald Alfred James,3,646,908.
Sams, Gerald R.: *See—*
Sams, Gerald R.; and Watson, Robert H., 3,648,073.
Sams, Gerald R.; and Watson, Robert H., to Sams, Gerald R., mesne. Pulse driver circuit apparatus. 3,648,073, Cl. 307-246.
Samson-Apparatebau A.G.: *See—*
Klee, Gerhard, 3,646,963.
Samuelson, Leon C., to Johnson, S. C., & Son, Inc. Pressurized package. 3,647,119, Cl. 222-402.18
San/Bar Electronics Corporation: *See—*
Fitzsimons, Alan R.; and Phelps, Robert J., 3,647,983.
Sanders, John Stewart; Savage, Donald Stanley; and Summerlin, Frederick Arthur, to Aerpat A. G., mesne. Lockbolt placing apparatus. 3,646,757, Cl. 60-54.5
Sanders, Lon L., to International Telephone and Telegraph Corporation. Aircraft electronic landing responser system using scanning pencil beam ground antenna. 3,648,285, Cl. 343-6.5
Sanders, Norman L.: *See—*
Wollney, John L.; Jawor, Ronald W.; and Sanders, Norman L.,3,646,680.
Sandoz A.G.: *See—*
Petrzilka, Theodor; Hofmann, Albert; Schenk, Hansruedi; Troxler, Franz; Frey, Albert; and Ott, Hans, 3,647,801.
Sandoz Ltd.: *See—*
Petrzilka, Theodor; Hofmann, Albert; Schenk, Hansruedi; Troxler, Franz; Frey, Albert; and Ott, Hans, 3,647,801.
Sanford, Douglas C., to Honeywell Inc. Single conductor arrangement for powering and triggering flash lamps. 3,648,105, Cl. 315-237.
Sanger, Richard B.: *See—*
Bunch, Raymond S.; and Sanger, Richard B.,3,648,205.
Sapunov, Georgy Konstantinovich: *See—*
Kostin, Konstantin Fedorovich; Sapunov, Georgy Konstantinovich; Svirin, Alvian Afanasievich; Strakhov, Valery Ivanovich; and Shur, Grigory Iosifovich,3,648,091.
Sarafidis, Christos, to Du Pont de Nemours, E. I., and Company. Cobalt salt-phosphine-organoaluminum catalysts for preparing 1,4-dienes. 3,647,901, Cl. 260-680.
Sargent, Donald E., to Radiation Research Corporation. Polymerization of 2-pyrrolidone in the presence of carbonyl sulfide. 3,647,764, Cl. 260-78.
Sargent Industries, Inc.: *See—*
Patterson, Donald S., 3,646,827.
Sarkisian, Robert. Poster display device. 3,646,696, Cl. 40-125.
Sarto, Jorma O., to Chrysler Corporation. Controlled floor jet engine exhaust recirculation. 3,646,923, Cl. 123-119.
Sasebo Heavy Industries Co., Ltd.: *See—*
Morita, Shichiro; Shimazu, Hiroshi; Saito, Tsutomu; Nakamura, Hiroshi; and Maeda, Torata, 3,647,149.
Sass, Donald J.: *See—*
Phelps, Jerry A.; and Sass, Donald J.,3,646,931.
Sata, Toshikatsu: *See—*
Mizutani, Yukio; Yamane, Reiichi; Sata, Toshikatsu; and Izuo, Ryuji,3,647,086.
Sata, Toshio: *See—*
Miyashita, Yoshio; Nishikawa, Katuhiko; and Sata, Toshio,3,647,425.
Sato, Jiro, to Canon Kabushiki Kaisha. Paper sheet feed device. 3,647,204, Cl. 271-36.
Sato, Masanori: *See—*
Watanabe, Toshio; Tsukamoto, Goro; Hayashi, Kimiaki; Sato, Masanori; and Iwasawa, Yoshio,3,647,799.
Sato, Takayoshi, to Kabushikikaisha Copal. Warning circuit for use in a TTL type electronic shutter. 3,648,053, Cl. 250-214.
Sato, Takehiko; and Sagami, Hiroyuki, to Mitsubishi Petrochemical Co., Ltd. Process for quenching a gas obtained by thermal cracking of hydrocarbons. 3,647,907, Cl. 260-683.
Saunders, Stuart R.: *See—*
Ford, James A.; Saunders, Stuart R.; Caule, Elmer J.; and McLain, Charles D.,3,646,946.
Saunders, Teddy G., to Vadic Corporation, The. Notch filter network with controllable response. 3,648,187, Cl. 330-21.
Saupe, Martin; and Farian, Gerhard, to Kaltenbach & Voigt. Collet chuck for a dental instrument. 3,646,677, Cl. 32-26.
Sauter, Walter A.: *See—*
Martin, David R.; and Sauter, Walter A.,3,648,176.
Savage, Donald Stanley: *See—*
Sanders, John Stewart; Savage, Donald Stanley; and Summerlin, Frederick Arthur,3,646,757.
Sawano, Takahiro: *See—*
Suenaga, Masanobu; Machii, Tetsuo; Sawano, Takahiro; Kobayashi, Takehiko; Dengo, Tadao; and Nakai, Tetsuzo,3,648,121.
S&C Electric Company: *See—*
Bernatt, Joseph; and Gutmann, John T., 3,647,996.
Scanfax Systems Corporation: *See—*
Trammell, James R., 3,647,987.
Scaramucci, Domer; and Adams, Ladd M., to Balon Corporation. Split body valve assembly. 3,647,179, Cl. 251-172.
Schachowskoy, Theodor: *See—*
Demme, Ernst; Schachowskoy, Theodor; Schuhmacher, Guenther; Fehlhaber, Juergen; and Hartmann, Ludwig,3,647,594.
Schafer, Thomas W., to Rohr Corporation. Self-contained hydraulic system for fluid actuated chuck. 3,647,231, Cl. 279-4.
Schaffer, Rupert E.: *See—*
Moseley, John C.; Schaffer, Rupert E.; and Radziwill, Anthony N.,3,647,527.
Schalkwijk, Jan, to U.S. Philips Corporation. Transmitting arrangement for use in tone frequency pushbutton selection systems. 3,648,202, Cl. 334-47.
Scharlack, Ronald S., to Kelsey-Hayes Company. Skid control system. 3,647,267, Cl. 303-21.
Schattauer, Friedrich: *See—*
Scholtis, Walter; Ploch, Siegfried; Schattauer, Friedrich; Schonfuss, Martin; and Heilmann, Horst,3,646,781.
Schaum, Helmut: *See—*
Leugering, Hans-Joachim; and Schaum, Helmut,3,647,922.
Schaum, Helmut, to Bunaweske Huls Gesellschaft mit beschrankter Haftung, mesne. Process for preparing amorphous copolymers from ethylene and higher α-olefins by means of modified. 3,647,768, Cl. 260-80.78
Scheele, Walter, KG: *See—*
Bille, Heinz, 3,647,326.
Scheer, David W., to Honeywell Inc. Tape drive error cancelling system. 3,648,141, Cl. 318-314.
Scheer, Kurt: *See—*
Busch, Carl Wilhelm; and Scheer, Kurt,3,648,283.
Scheffer, Hendrik J.: *See—*
De Groot, Johannes H.; Scheffer, Hendrik J.; and Smit, Willem H.,3,647,192.
Scheffler, Bernard: *See—*
Hardwicke, James E.; Scheffler, Bernard; and Weisz, Herman S.,3,647,734.
Schellenberg, James M.: *See—*
Buck, Daniel C.; and Schellenberg, James M.,3,648,199.
Schenck, Hermann: *See—*
Wenzel, Werner; and Schenck, Hermann,3,647,379.
Schenck, Jackson C.: *See—*
Morgan, Harvey E.; Suttle, Theodore; and Schenck, Jackson C.,3,646,984.
Schenk, Hansruedi: *See—*
Petrzilka, Theodor; Hofmann, Albert; Schenk, Hansruedi; Troxler, Franz; Frey, Albert; and Ott, Hans,3,647,801.

Schernthaner, Matthias: *See*—
Truppe, Meinhard; Schernthaner, Matthias; and Poferl, Gunter,3,647,559.
Truppe, Meinhard; Schernthaner, Matthias; and Poferl, Gunter,3,647,560.
Schiel, Christian, to Voith, J. M., GmbH. Roller press, especially a washing press for paper machine felts, having a floating roller. 3,647,621, Cl. 162-274.
Schier, Jacques, to Martin-Brower Corporation. Combination oven and illuminated display assembly. 3,648,010, Cl. 219-214.
Schiller, Teddy M., to Purex Corporation, Ltd. Fluid delivery system for aircraft windshields. 3,647,167, Cl. 244-121.
Schilling, Arthur G., to General Electric Company. Variable impedance generator. 3,647,925, Cl. 35-13.
Schlesinger, Robert J.: *See*—
Schlesinger, Robert J.; and Raabe, George A., 3,647,959.
Schlesinger, Robert J.; and Raabe, George A., to Schlesinger, Robert J., mesne. System for generating a hologram. 3,647,959, Cl. 178-7.87
Schloemann Aktiengesellschaft: *See*—
Geipel, Hans; Schulz, Alfred; and Huber, Helmut, 3,646,655.
Schlosburg, Burton E.: *See*—
Frey, Alexander H., Jr.; Schlosburg, Burton E.; and Tygielski, Ralph E.,3,648,237.
Schlott, Richard J.; Hoeg, Donald F.; and Pendleton, John F., to Borg-Warner Corporation. Method for hydrocarbon soluble organo sodium compounds. 3,647,803, Cl. 260-268.
Schlumberger Technology Corporation: *See*—
Miller, Gerald K., 3,648,278.
Schmaus, Robert Leslie, to Parker Hannifin Corporation. Hydraulic press. 3,647,332, Cl. 425-78.
Schmid & Wezel, Firma: *See*—
Wezel, Hans Georg, 3,646,675.
Schmidhammer, Ludwig: *See*—
Fruhwirth, Otto; and Schmidhammer, Ludwig,3,647,895.
Schmidt, Otto Karl: *See*—
Blewitt, Donald Joseph; and Schmidt, Otto Karl,3,646,943.
Schmitz, Heinz: *See*—
Roscher, Gunter; and Schmitz, Heinz,3,647,882.
Schmitz, Henry, to Bristol-Myers Company. Kasugamycin substituted antibacterial agents. 3,647,779, Cl. 260-210.
Schmitz, William D.: *See*—
Hinchman, Gerald V.; Sommerville, James L.; and Schmitz, William D.,3,646,817.
Schmock, John W.: *See*—
Schoenherr, Leonard W.; Schoenherr, Robert O.; and Schmock, John W.,3,647,604.
Schneider, Friedrich August, to International Nickel Company, Inc., The. Battery plate having dual porosity. 3,647,544, Cl. 136-24.
Schneider, George, to Amchem Products, Inc. Metal coating rinse composition. 3,647,569, Cl. 148-6.16
Schnell, Gerhard: *See*—
Wilke, Gerhard; Schnell, Gerhard; and Hoyer, Karl,3,647,014.
Schnelle, Herbert, Velox-Werk: *See*—
Schnelle, Klaus, 3,647,274.
Schnelle, Klaus, to Schnelle, Herbert, Velox-Werk. Tubular frame for furniture. 3,647,274, Cl. 312-257.
Schneller, Heinz: *See*—
Ryffel, Kaspar; and Schneller, Heinz,3,647,758.
Schoenherr, Leonard W.; Schoenherr, Robert O.; and Schmock, John W., to Foliage Co. of America. Reinforced foamed plastic wreath ring. 3,647,604, Cl. 161-15.
Schoenherr, Robert O.: *See*—
Schoenherr, Leonard W.; Schoenherr, Robert O.; and Schmock, John W.,3,647,604.
Schoerner, Roger J., to Southwire Company. Method of the preparation of a solid insulated conductor. 3,647,562, Cl. 148-2.
Schoerner, Roger J., to Southwire Company. Method of the preparation of a multi-filament conductor. 3,647,563, Cl. 148-2.
Schoerner, Roger J., to Southwire Company. Method of the preparation of a insulated telephone cable. 3,647,564, Cl. 148-2.
Schoerner, Roger J., to Southwire Company. Reinforced composite aluminum alloy conductor cable. 3,647,939, Cl. 174-128.
Schofield, Richard Westwell, to General Engineering Company (Radcliffe) Limited. Winding of continuous strands. 3,647,153, Cl. 242-82.
Scholtis, Walter; Ploch, Siegfried; Schattauer, Friedrich; Schonfuss, Martin; and Heilmann, Horst, to Forschungsintitut fur Textillechnologie Karl-Marx- Stadt. Method and apparatus for producing knitted fleeces on multi-needle knitting machines. 3,646,781, Cl. 66-85.
Schone, Helmut; Weisbach, Gunter; Johne, Hans; Kuhn, Fritz; and Lein, Werner, to Veb Polygraph Leipzig,-Kombinat fuer Polygraphiche Maschinen und Ausrustugen. Method and apparatus for feeding of sheets fittingly aligned to a machine. 3,647,205, Cl. 271-57.
Schoneborn, Hellmuth, to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung. Method and apparatus for searching, selecting and tracking targets utilizing a radar having a range gate. 3,648,286, Cl. 343-7.3
Schonfuss, Martin: *See*—
Scholtis, Walter; Ploch, Siegfried; Schattauer, Friedrich; Schonfuss, Martin; and Heilmann, Horst,3,646,781.
Schonitz, Egon: *See*—
Oppermann, Willi; Schonitz, Egon; and Wagner, Werner,3,648,007.
Schraff, Fred R. Protective switch device. 3,648,058, Cl. 307-10.
Schrantz, William J., Jr., to International Rubber Industries, Inc. Premixed elastomeric compounding composition and process. 3,647,704, Cl. 252-182.
Schreiber, Ronald S.: *See*—
Chapman, Douglas W.; Overley, Richard Dean; Rands, Robert D., Jr.; and Schreiber, Ronald S.,3,647,492.
Schrenk, Walter J.; Chisholm, Douglas S.; Cleereman, Kenneth J.; and Alfrey, Turner, Jr., to Dow Chemical Company, The. Multilayer plastic articles. 3,647,612, Cl. 161-165.
Schrock, Larry R., to Ford Motor Company. Variable ratio lever mechanism. 3,646,830, Cl. 74-516.
Schroder, Jurgen; and Nussbaum, Hans Georg, to U.S. Philips Corporation. Arrangement for proportioning actively or passively light-radiating surfaces. 3,648,272, Cl. 340-324.
Schroder, Jurgen; Wichmann, Onno; and Zuchner, Werner, to U.S. Philips Corporation. Sensing device. 3,648,024, Cl. 235-61.11
Schroerner, Roger J., to Southwire Company. Method of the preparation of a insulated aluminum alloy magnet wire. 3,647,565, Cl. 148-2.
Schrum, George L.: *See*—
Dieterich, Donald B.; and Schrum, George L.,3,647,126.
Schucker, Emil: *See*—
Perrot, Alexander; and Schucker, Emil,3,647,140.
Schuhmacher, Guenther: *See*—
Demme, Ernst; Schachowskoy, Theodor; Schuhmacher, Guenther; Fehlhaber, Juergen; and Hartmann, Ludwig,3,647,594.
Schultz, August L. Groin support. 3,646,932, Cl. 128-95.
Schulz, Alfred: *See*—
Geipel, Hans; Schulz, Alfred; and Huber, Helmut,3,646,655.
Schulz, George H.: *See*—
Lojkutz, Bruno V.; Warner, Dale J.; and Schulz, George H.,3,647,227.
Schulz, Jay R.; and Clark, William H., to Dow Corning Corporation. Room temperature vulcanizable silicone rubber with unprimed adhesion. 3,647,917, Cl. 260-825.
Schulze, Ulrich; and Meyer, Gerhard, to Glanzstoff AG. N,N'-Bis-(phenyl)-oxamidrazone. 3,647,878, Cl. 260-564.
Schumacher, Joseph S., to International Minerals and Chemical Corporation. Method for reducing pollution in foundries. 3,646,987, Cl. 164-5.
Schuman, Ralph H., to Warner & Swasey Company, The. Segmented scale. 3,648,276, Cl. 340-347.
Schwarzbauer, Hans: *See*—
Eck, Herbert; Schwarzbauer, Hans; and Spes, Hellmuth,3,647,871.
Schwarzkopf, Hans, GmbH: *See*—
Lange, Fritz-Walter, 3,647,351.
Schwemer, Warren C.: *See*—
Reed, Madison W., Jr.; and Schwemer, Warren C.,3,647,551.
Schwemmer, Martin W.: *See*—
Calzaferri, Hans; Kunz, Werner; Schwemmer, Martin W.; and Wyler, Max,3,647,353.
Schweri, Raphael Joseph, to Celanese Coatings Company. Post-dipping of acidic deposition coatings. 3,647,567, Cl. 148-6.15
Schwind, Herbert. Appliance for diagnosis and therapeutic eye treatment. 3,647,287, Cl. 351-38.
Science Accessories Corporation: *See*—
Whetstone, Albert L., 3,647,962.
Whetstone, Albert L.; and Fine, Samuel, 3,648,277.
SCM Corporation: *See*—
Cermak, Robert E., 3,647,480.
Guzak, John, Jr., 3,648,247.
Scolaro, Donald A.: *See*—
Sullivan, Wayne A.; and Scolaro, Donald A.,3,648,067.
Scotland, John Louis, to British Resin Products Limited. Plastics containers for fuel storage. 3,647,613, Cl. 161-165.
Scott & Fetzer Company, The: *See*—
MacFarland, Charles H., 3,646,632.
Scott, Robert J.; and Aberer, Leo F., to Rival Manufacturing Company. Electric can opener with removable hand lever and frame engaging pin assembly. 3,646,671, Cl. 30-4.
Scovill Manufacturing Company: *See*—
Drude, Edward H.; and Mangum, Bennie Franklin, 3,647,142.
Sealed Power Corporation: *See*—
Overway, Roy E., 3,646,797.
Searle, Eric H.; and Goud, Eric G., to Dunlop Holdings Limited. Method and apparatus for detecting reinforcement spacing variation by microwave diffraction. 3,648,164, Cl. 324-58.5
Seay, Orum E.; and Shelton, Robert O., to Halliburton Company. Hydraulic cushioning apparatus for railway cars. 3,647,088, Cl. 213-8.
Sedlak, Charles K.: *See*—
Vischulis, George; and Sedlak, Charles K.,3,647,600.
Segars, Douglas L.: *See*—
Pruitt, Charles N.; Segars, Douglas L.; and Miller, Walter L.,3,647,336.
Segawa, Mitsuru: *See*—
Irakura, Tsutomu; Kasuga, Kazuga; and Segawa, Mitsuru,3,647,805.

Seiferth, Oscar E.; Goller, Robert L.; Grindrod, Paul E.; and Radloff, Harry L., to Mayer, Oscar, & Co., Inc. Package and method of making same. 3,647,485, Cl. 99-174.

Seil, Kenneth F.: *See—*
Colt, Ralph C.; and Seil, Kenneth F.,3,647,499.

Seiling, Alfred W.: *See—*
Venerable, James T.; Miyashiro, James; and Seiling, Alfred W.,3,647,849.

Seitzer, Dieter: *See—*
Closs, Felix H.; Seitzer, Dieter; and Stucki, Peter,3,647,949.

Seki, Toshio; Suzuki, Kozaburo; and Matsuzaki, Takashi, to Nitto Kasei Co., Ltd. Light-stabilized polymers. 3,647,746, Cl. 260-45.75

Sekida, Minoru, to Minolta Camera Kabushiki Kaisha. Mechanism for operating the reflecting mirror in a single-lens reflex camera. 3,646,868, Cl. 95-42.

Seko, Maomi; Takahashi, Yasunobu; Iwamoto, Takeaki; and Seno, Shikazo, to Asahi Kasei Kogyo Kabushiki Kaisha. Purification of adiponitrile containing fractions. 3,647,855, Cl. 260-465.8

S. E. Laboratories(Holdings) Limited: *See—*
Talbert, David Godwin, 3,648,098.

Select Systems, Inc.: *See—*
Johnson, James H.; and McGuire, William C., 3,647,118.

Semancik, John R.: *See—*
Bufton, Richard G.; Semancik, John R.; and King, George G.,3,647,769.

Semel, Bernard J. Method of making practical joke smoke emitting articles. 3,646,845, Cl. 86-20.

Sengbush, Raymond L. Correcting seismic traces for static corrections and normal moveout. 3,648,227, Cl. 340-15.5

Sennewald, Kurt; Hauser, Alfred; and Lork, Winfried, to Knapsack Aktiengesellschaft. Process for the manufacture of acrylic acid by the oxidation of propylene and/or acrolein. 3,647,867, Cl. 260-530.

Seno, Shikazo: *See—*
Seko, Maomi; Takahashi, Yasunobu; Iwamoto, Takeaki; and Seno, Shikazo,3,647,855.

Senoo, Masao: *See—*
Hara, Shigeyoshi; Senoo, Masao; Yoshida, Tsunemasa; and Uchida, Moriya,3,647,762.

Serracchioli, Francesco; and Bartocci, Antonio, to Olivetti, Ing. C., & C., S.p.A. Terminal apparatus for transmitting and receiving information. 3,648,251, Cl. 340-172.5

Service d'Exploitation Industrielle des Tabacs et des Allumettes:*See—*
Godet, Jean, 3,646,971.

Sevcon Engineering Limited: *See—*
Gurwicz, David, 3,648,151.

Sewell, Frank A., Jr., to Sperry Rand Corporation. Optical memory circuit. 3,648,258, Cl. 340-173.

Shah, Gautham C., to Burroughs Corporation. Web tensioning device. 3,647,128, Cl. 226-195.

Shakiba, Hosein M. Flash vapor burner. 3,647,347, Cl. 431-37.

Shamay, Menashe. Photographic film roll. 3,647,465, Cl. 96-78.

Sharpless, Edward N.; and Davis, Frederick, to Liquid Crystal Industries, Inc. Color display devices. 3,647,279, Cl. 350-160.

Shaver, Kenneth J.: *See—*
Xim, Keun Young; and Shaver, Kenneth J.,3,647,371.

Shawhan, Elbert N., to Sun Oil Company. Capacitance measuring apparatus including means maintaining the voltage across the unknown capacitance constant. 3,648,165, Cl. 324-60.

Sheffer, Ralph L., Jr., to Omark-Winslow Aerospace Tool Co. Machine for riveting nutplates to support structures. 3,646,660, Cl. 29-243.53

Shelffo, Loren EE.: *See—*
Baltazzi, Evan S.; Shelffo, Loren EE.; and Moduthagam, Michael,3,646,866.

Shell Oil Company: *See—*
Bauer, Ronald S.; Glockner, Peter W.; Keim, Wilhelm; and Mason, Ronald F., 3,647,915.
Buls, Vernon W.; and Grimsby, F. Norman, 3,647,639.
De Groot, Johannes H.; Scheffer, Hendrik J.; and Smit, Willem H., 3,647,192.
Farley, Francis F., 3,647,906.
Glockner, Peter W.; Keim, Wilhelm; and Mason, Ronald F., 3,647,914.
Hamby, Tyler W., Jr.; and Strickland, William T., Jr., 3,646,999.
Medema, Dirk; Brunmayer-Schilt, Willy; and Van Helden, Robert, 3,647,908.
Moseley, John C.; Schaffer, Rupert E.; and Radziwill, Anthony N., 3,647,527.
Van Daalen, Francois, 3,646,770.

Shelly, Ned R. Ditch building apparatus. 3,646,767, Cl. 61-41.

Shelton, Robert O.: *See—*
Seay, Orum E.; and Shelton, Robert O.,3,647,088.

Shema, Bernard F.; Brink, Robert H., Jr.; and Swered, Paul, to Betz Laboratories, Inc. Synergistic composition and its use. 3,647,703, Cl. 252-180.

Shepard, Richard W.: *See—*
Ashmead, Albert S.; and Shepard, Richard W.,3,647,057.

Shepherd, Alexander Turnbull,; Smith, Laurence Philip; and Taylor, Lockhart, to Ferranti, Limited. Scale conversion apparatus. 3,648,030, Cl. 235-92.

Sherman, Warren S.; Troth, Dennis L.; and Bennett, William A., to General Motors Corporation. Variable geometry torque converter. 3,646,755, Cl. 60-54.

Sherrill, Bruce E., Jr.: *See—*
Levine, David J.; and Sherrill, Bruce E., Jr.,3,647,497.

Sherwood, Richard C.: *See—*
Gyorgy, Ernst M.; Sherwood, Richard C.; and Van Uitert, Le Grand G.,3,648,260.

Shick, Philip E.: *See—*
Chari, Nallan C. S.; Olson, Kermit E.; and Shick, Philip E.,3,647,363.

Shields, Martin A., to Bendix Corporation, The. Detent mechanism for rack and pinion power steering. 3,646,852, Cl. 91-467.

Shigehiro, Kosuke: *See—*
Ito, Ken; Kaminaka, Hiroshi; Kotera, Norio; Yamamoto, Shinji; Dohgane, Iwao; Shigehiro, Kosuke; Kuruma, Hiroshi; Chinuki, Takashi; Yoshitake, Hiroshi; Tanimoto, Kenji; Hasegawa, Shinichi; and Kobayasi, Nobuki,3,647,866.

Shillam, Norman Frederick, to National Research Development Corporation. Machine tool control systems. 3,646,839, Cl. 82-1.

Shimada, Katsunori: *See—*
United States of America,National Aeronautics and Space Administration, Administrator, 3,648,152.

Shimadzu Seisakusho Ltd.: *See—*
Kubodera, Toshiya; Hara, Tasuku; and Makabe, Hideki, 3,647,390.

Shimazaki, Hideo; Tsukamoto, Shuji; Saito, Tadaomi; Eguchi, Sadanari; and Komata, Yasushi, to Ajinomoto Co., Inc. Method of making and using 4-hydroxy-5-methyl-2, 3-dihydrofuran-3-one. 3,647,825, Cl. 260-347.8

Shimazu, Hiroshi: *See—*
Morita, Shichiro; Shimazu, Hiroshi; Saito, Tsutomu; Nakamura, Hiroshi; and Maeda, Torata,3,647,149.

Shionogi & Co., Ltd.: *See—*
Katagiri, Ken, 3,647,631.

Shizuya, Kyoto: *See—*
Tateisi, Kazuma; Mizuta, Yukio; and Shizuya, Kyoto,3,648,020.

Shoji, Osamu; Hironaka, Jouji; and Kotani, Hirotada, to Dainippon Pharmaceutical Co., Ltd. Process for the production of adenosine by microorganisms. 3,647,626, Cl. 195-28.

Showa Denko Kabushiki Kaisha: *See—*
Yano, Tomosaburo; Oishi, Naoaki; Komatsu, Akitoshi; and Koyama, Keizi, 3,647,415.

Shur, Grigory Iosifovich: *See—*
Kostin, Konstantin Fedorovich; Sapunov, Georgy Konstantinovich; Svirin, Alvian Afanasievich; Strakhov, Valery Ivanovich; and Shur, Grigory Iosifovich,3,648,091.

Shutt, Paul B.: *See—*
Hughes, Harold W.; and Shutt, Paul B.,3,646,759.

Siegel, Eric J. Video color synthesizer. 3,647,942, Cl. 178-5.4

Siekanowicz, Wieslaw Wojciech, to RCA Corporation. Microwave limiter that suppresses leading edge spike of radio frequency signals. 3,648,197, Cl. 333-17.

Siemens Aktiengesellschaft: *See—*
Baum, Wilhelm, 3,647,491.
Kadow, Hermann, 3,648,262.
Mertens, Willi, 3,647,611.
Rohloff, Ebbe; and Lorenz, Richard, 3,647,926.
Ungnadner, Friedrich, 3,648,029.

Sierra, Hugh M., to International Business Machines Corporation. Apparatus and method for obtaining the reciprocal of a number and the quotient of two numbers. 3,648,038, Cl. 235-164.

Sigiyama, Hiroshi; Ikeda, Takuo; and Itani, Takashi, to Sumitomo Chemical Company, Ltd. Reactive phthalocyanate dyes containing an arylureamethylene group. 3,647,827, Cl. 260-372.

Silbert, Leonard S.; and Swern, Daniel. Process for the preparation of alkyl and aryl iodine. 3,647,893, Cl. 260-646.

Sill, Arthur D.; and Fleming, Robert W., to Richardson-Merrell Inc. Fluorene bis-basic esters. 3,647,860, Cl. 260-475.

Simboli, Paul: *See—*
Mc Gaughey, Robert S.; and Simboli, Paul,3,646,651.

Simmons, Lovel R. Elevator control for earth moving apparatus. 3,646,693, Cl. 37-8.

Simon, Wilhelm; Moller, Willi; and Dohner, Rene, to Moller, Blasblaserei Inhaber, Gebruder, and Moller, Willi. Measuring electrode for measuring of ions in solutions. 3,647,666, Cl. 204-195.

Simpson, Jack W.: *See—*
McConnell, Robert L.; and Simpson, Jack W.,3,648,271.

Sinclair Research, Inc.: *See—*
Clough, Thomas J., 3,647,731.
Gower, Bob G.; and Poss, Richard F., 3,647,732.

Singer Company, The: *See—*
Meyer, Bennett A.; and McGuire, Kenyon E. B., 3,648,145.
Rathjen, J. Fred; and Laermer, Lothar, 3,648,113.

Singer-General Precision, Inc.: *See—*
White, Alvin S., 3,648,232.

Single, David, to Motorola, Inc. Method of reclaiming and coating phosphor. 3,647,522, Cl. 117-100.

Sitt, Eddie. Article with removable ornament that also serves as a fastener. 3,646,642, Cl. 24-97.

Skaggs, Preston H. Truck bed. 3,647,097, Cl. 214-506.

Skala, George Frank, to Environment/One Corporation. Dual beam fluid monitor for measuring transmitted and scattered light. 3,647,300, Cl. 356-73.

Skaletzky, Louis L.: *See—*
Rynbrandt, Ronald H.; and Skaletzky, Louis L.,3,647,804.

Skandinavisk Emballage Aktieselskab: *See—*
Orstam, Preben Einar Roar, 3,647,044.

Skeels, Gary William, Jr.: *See—*
Rabo, Jule Anton; Angell, Charles Leslie; and Skeels, Gary William, Jr.,3,647,682.

Skibo, Andrew D.; and Woodworth, Chester L., to Monsanto Company. Apparatus for controlling back pressure in an extruder. 3,647,344, Cl. 425-379.

Sklar, J., Mfg. Co., Inc.: *See—*
Sklar, John, 3,646,939.

Sklar, John, to Sklar, J., Mfg. Co., Inc. Towel clamp. 3,646,939, Cl. 128-321.

Skrupsky, Voldemar Petrovich: *See—*
Berzin, Gunard Valdemarovich; Kalnin, Arvid Yanovich; Sushkov, Alexandr Fedorovich; Skrupsky, Voldemar Petrovich; Ziemelis, Andris Eduardovich; Soloviev, Boris Fedorovich; Leeniex, Karl Mikhailovich; Sovetin, Vladimir Kirilovich; Gulbis, Yan Karlovich; Dalbinsh, Yan Yanovich; Priede, Bruno Andreevich; Upman, Karl Kristapovich; Muzhits, Vitold Iosifovich; Junga, Yan Petrovich; Krogzem, Ivar Arnoldovich; Greitan, Zigurd Boleslavovich; and Rotsen, Karl Arturovich,3,646,687.

Sligh, Cecil E.: *See—*
Pinner, Champ D.; Sligh, Cecil E.; Diehl, James J.; and Garland, Wade H., Jr.,3,648,163.

Slonneger, John L., to General Electric Company. Condition responsive electric switch mechanism. 3,648,214, Cl. 337-311.

Small, Bernard J. Apparatus and process for forming tubular bodies. 3,646,657, Cl. 29-200.

Smart, Edwin Allen, to Bradley Washfountain Co. Control member for proportioning valves. 3,646,966, Cl. 137-625.4

Smedley, William L. Well pipe seal. 3,647,230, Cl. 277-212.

Smidth, F. L., & Co.: *See—*
Andersen, Axel Brix, 3,646,838.

Smiljanic, John P.: *See—*
Rott, Dennis A.; and Smiljanic, John P.,3,647,730.

Smit, Willem H.: *See—*
De Groot, Johannes H.; Scheffer, Hendrik J.; and Smit, Willem H.,3,647,192.

Smith, A. O., Corporation: *See—*
Hamerski, Frank D., 3,646,874.

Smith, Bernard. Aerohydrofoil steering control. 3,646,902, Cl. 114-66.5

Smith, Donald A.; and Verdone, Joseph A., to Eastman Kodak Company. Sulfonated poly(vinyl alcohol) derivatives as absorbent layers in photographic processing webs. 3,647,464, Cl. 96-76.

Smith, Frank Thomas John: *See—*
Gerstenberg, Dieter; and Smith, Frank Thomas John,3,647,662.

Smith, Harold Eugene, to Smithpac Canada Ltd. Refuse collecting apparatus and system. 3,647,095, Cl. 214-41.

Smith, Haroid Eugene, to Smithpac Canada Ltd. Dump body pivot system and lock. 3,647,098, Cl. 214-508.

Smith, Harold R., to United States of America, Navy. Launch bar installation. 3,647,164, Cl. 244-63.

Smith, Herchel: *See—*
Stein, Reinhardt P.; Smith, Robert C., Jr.; and Smith, Herchel,3,647,784.

Smith, Jonathan S., II: *See—*
Mazdiyasni, Khodabakhsh S.; Dolloff, Richard T.; and Smith, Jonathan S., II,3,647,364.

Smith, Joseph E., to Wolverine-Pentronix, Inc. Apparatus for injecting a fluid into powdered materials being compacted. 3,647,333, Cl. 425-78.

Smith, Landon: *See—*
Dillard, Weldon B., 3,646,824.

Smith, Laurence Philip: *See—*
Shepherd, Alexander Turnbull,; Smith, Laurence Philip; and Taylor, Lockhart,3,648,030.

Smith, Martin B.: *See—*
Hudson, Russell L.; Williams, Kenneth C.; and Smith, Martin B.,3,647,777.

Smith, Ray F. Garbage incinerator and method of operation. 3,647,405, Cl. 65-19.

Smith, Richard F.Halogenated 2(2'-hydroxyphenyl) benzothiazoles. 3,647,812, Cl. 260-304.

Smith, Robert C., Jr.: *See—*
Stein, Reinhardt P.; Smith, Robert C., Jr.; and Smith, Herchel,3,647,784.

Smith, Roland T., to Novar Corporation. Electrical character select mechanism for typewriter. 3,647,042, Cl. 197-19.

Smith, Trevor Stanley, to Lucas, Joseph, (Industries) Limited. Servo mechanism. 3,646,849, Cl. 91-52.

Smith, William R.; Rice, Rex; and Mazor, Stanley, to Fairchild Camera and Instrument Corporation. Hardware oriented paging control system. 3,647,348, Cl. 444-1.

Smithe, F. L., Machine Company, Inc.: *See—*
Helm, Herbert W., 3,646,858.

Smithpac Canada Ltd.: *See—*
Smith, Harold Eugene, 3,647,095.
Smith, Harold Eugene, 3,647,098.

Smiths Industries Limited: *See—*
Barnard, Dominic Paul Edward; and Bishop, Brian L. H., 3,648,044.

Smitmajer, Zdenek: *See—*
Majek, Vladimir; Krajmer, Anton; and Smitmajer, Zdenek,3,648,140.

Snam Progetti S.p.A.: *See—*
Cesca, Sebastiano; Roggero, Arnaldo; and Marconi, Walter, 3,647,767.

Snelling, Christopher: *See—*
Keller, Carol K.; Royka, Stephen F.; and Snelling, Christopher,3,647,659.

Snelling, James W., to Amex Corporation. Method and apparatus for pollution free burning of automobile bodies. 3,646,897, Cl. 110-8.

Snow, Harold Forest, to Borden Inc. Method and apparatus for cleaning clams. 3,646,638, Cl. 17-53.

Snyder, James H., to Clark Equipment Company. Means for controlling automatically moved vehicle. 3,646,890, Cl. 104-1.

Sobel, Alan, to Zenith Radio Corporation. Flat-panel image display with plural display devices at each image point. 3,647,958, Cl. 178-7.3

Societa' Farmaceutici Italia:*See—*
Bernardi, Luigi; Bosisio, Germano; and Temperilli, Aldemio, 3,647,655.

Societa per Azioni Ferrania: *See—*
Calligaris, Ennio; and Rossello, Mario, 3,647,450.
Guzzi, Alberto; Magagnoli, Remo; and Vittore, Lorenzo, 3,647,468.

Societe Anonyme Telecommunications Radioelectriques et Telephoniques, T.R.T.: *See—*
Stein, Michel Guy Pierre, 3,647,967.

Societe d'Exploitations Chimiques et Pharmaceutiques Seceph S.A.:*See—*
Massarani, Elena; Nardi, Dante; and Degen, Ludwig, 3,647,879.

Societe en nom Collectif 'Science Union et Cie.':*See—*
Regnier, Gilbert; Canevari, Roger; and Laubie, Michel, 3,647,794.

Societe Francaise de Recherche Medicale: *See—*
Regnier, Gilbert; Canevari, Roger; and Laubie, Michel, 3,647,794.

Societe Industrielle de Brevets et d'Etudes S.I.B.E.:*See—*
Mennesson, Andre Louis, 3,646,914.

Soderkvist, Lars O. A.: *See—*
Jidling, Kjell Esbjorn; and Soderkvist, Lars O. A.,3,646,960.

Soehner, Gerhard; and Hoehne, Gerd, to Bosch, Robert, G.m.b.H. Electromechanical transducer assembly. 3,648,155, Cl. 323-94.

Sognefest, Peter W.; and Estes, Bay E., III, to Essex International Inc. Vehicular plex-path circumferential control and distribution system. 3,648,057, Cl. 307-10.

Solartron Electronic Group Limited, The: *See—*
Wold, Ivar, 3,648,040.

Solomon, Jack M.: *See—*
Bluestein, Bernard R.; and Solomon, Jack M.,3,647,795.

Soloviev, Boris Fedorovich: *See—*
Berzin, Gunard Valdemarovich; Kalnin, Arvid Yanovich; Sushkov, Alexandr Fedorovich; Skrupsky, Voldemar Petrovich; Ziemelis, Andris Eduardovich; Soloviev, Boris Fedorovich; Leeniex, Karl Mikhailovich; Sovetin, Vladimir Kirilovich; Gulbis, Yan Karlovich; Dalbinsh, Yan Yanovich; Priede, Bruno Andreevich; Upman, Karl Kristapovich; Muzhits, Vitold Iosifovich; Junga, Yan Petrovich; Krogzem, Ivar Arnoldovich; Greitan, Zigurd Boleslavovich; and Rotsen, Karl Arturovich,3,646,687.

Solt, Paul E., to Fuller Company. Airlift blending apparatus. 3,647,188, Cl. 259-4.

Sommerville, James L.: *See—*
Hinchman, Gerald V.; Sommerville, James L.; and Schmitz, William D.,3,646,817.

Sonoco Products Company: *See—*
Pinner, Champ D.; Sligh, Cecil E.; Diehl, James J.; and Garland, Wade H., Jr., 3,648,163.

Sony Corporation: *See—*
Kobayashi, Isamu, 3,648,128.
Watanabe, Yoshimi, 3,647,984.

Soper, Quentin Francis, to Lilly, Eli, and Company. 2-Piperidino-3-phenylquinoxaline compounds. 3,647,793, Cl. 260-250.

Soulant, Herman A., Jr., to United States of America, Navy. Magnetic linearity tensiductor for measuring tension in a running line. 3,648,161, Cl. 324-34.

Soules, Jack A., to United States of America, Navy. Pulse chirp laser ranging device. 3,647,298, Cl. 356-5.

Southwire Company: *See—*
Schoerner, Roger J., 3,647,562.
Schoerner, Roger J., 3,647,563.
Schoerner, Roger J., 3,647,564.
Schoerner, Roger J., 3,647,939.
Schroerner, Roger J., 3,647,565.

Sovetin, Vladimir Kirilovich: *See—*
Berzin, Gunard Valdemarovich; Kalnin, Arvid Yanovich; Sushkov, Alexandr Fedorovich; Skrupsky, Voldemar Petrovich; Ziemelis, Andris Eduardovich; Soloviev, Boris Fedorovich; Leeniex, Karl Mikhailovich; Sovetin, Vladimir Kirilovich; Gulbis, Yan Karlovich; Dalbinsh, Yan Yanovich; Priede, Bruno Andreevich; Upman, Karl Kristapovich; Muzhits, Vitold Iosifovich; Junga, Yan Petrovich; Krogzem, Ivar Arnoldovich; Greitan, Zigurd Boleslavovich; and Rotsen, Karl Arturovich,3,646,687.

Spacetac Incorporated: *See—*
Fiore, Anthony N.; and McCarron, John D., 3,648,181.

Spalding, Thomas P. Ignition system. 3,646,922, Cl. 123-117.

Spectrol Electronics Corporation: *See—*
DeLong, Robert J.; and Gerwitz, Paul F., 3,648,217.

Speech, Steven R.; Opie, Joseph W.; and Bridge, John A., to General Mills, Inc. Beverage mix. 3,647,472, Cl. 99-34.

Spence, John H.: *See—*
Ferris, Ray L.; and Spence, John H.,3,647,248.
Spencer, Louis L.: *See—*
Reynolds, Rolfe E.; and Spencer, Louis L.,3,646,899.
Sperry Rand Corporation: *See—*
Binkley, Carl R.; and Farrell, Robert G., 3,646,668.
Connett, Donald C.; Olsen, Gerald N.; and Lonnemo, Kurt R., 3,646,959.
Kritz, Jacob A.; and Lerner, Seymour D., 3,648,225.
Sewell, Frank A., Jr., 3,648,258.
White, John M., 3,647,519.
Spes, Hellmuth: *See—*
Eck, Herbert; Schwarzbauer, Hans; and Spes, Hellmuth,3,647,871.
Spicer, Oliver V., 1/2 to Rodgers, Swain. Photographic developing machine automatic cut off. 3,647,124, Cl. 226-46.
Spiegel, Si I., to American Technical Industries, Inc. Artificial plant utilizing a three-dimensional shell framework. 3,647,605, Cl. 161-31.
Spietschka, Ernst; and Ische, Friedrich, to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning. Dyestuffs of the anthraquinone series. 3,647,828, Cl. 260-380.
Spiliotis, Nicholas J., to Allied Chemical Corporation. Stabilized peptone solutions and plating baths containing the same. 3,647,652, Cl. 204-43.
Spitz, Robert Paul: *See—*
Kay, Edward Leo; Hunt, Jerry Donald; and Spitz, Robert Paul,3,647,739.
Sprague, Dennis R.: *See—*
Toledo, Emil; and Sprague, Dennis R.,3,647,654.
Sprague, James M.: *See—*
Ziegler, Carl; and Sprague, James M.,3,647,873.
Squaires-Sanders, Inc.: *See—*
Glover, William T.; and Kelly, Eugene W., 3,647,972.
Square D Company: *See—*
Jorgensen, George N., 3,647,937.
Squassoni, Gino F.: *See—*
Egnaczak, Raymond K.; and Squassoni, Gino F.,3,647,290.
Squibb, E. R., & Sons, Inc.: *See—*
Levine, Seymour D.; and Diassi, Patrick A., 3,647,820.
Wieslogle, Frederick Y.; and Bernstein, Jack, 3,647,781.
Srinivasan, Rangaswamy; and Hiraoka, Hiroyuki, to International Business Machines Corporation. Method of preparing α substituted β, γ unsaturated lactones from alkoxyfurans. 3,647,656, Cl. 204-158.
Srock, Rainer: *See—*
Porsche, Ferdinand Anton Ernst; and Srock, Rainer,3,647,258.
Stackpole Carbon Company: *See—*
Bang, Mogens W., 3,648,215.
Stager, Francis W.; and Minor, Robert N., to Biocor Corporation, mesne. Bio-degradable container. 3,647,111, Cl. 220-83.
Stahlgruber, Otto Gruber, & Company: *See—*
Felden, Alois Peter, 3,647,589.
Stamicarbon N.V.: *See—*
Bonnema, Jentje; and Pijpers, Emanuel M. J., 3,647,754.
Kaasenbrood, Petrus J. C.; and Taks, Gerardus J. J. M., 3,647,872.
Stampfli, Harald, to Lucifer S.A. Valve mechanism. 3,646,969, Cl. 137-627.5
Standard Oil Company: *See—*
Wolff, William F.; Rosscup, Robert J.; and Ridgway, John A., Jr., 3,647,677.
Standard Oil Company (Indiana): *See—*
Lee, Richard J., 3,647,692.
Standard Oil Company, The (Ohio): *See—*
Boos, Donald L.; and Metcalfe, Joseph E., III, 3,648,126.
Jones, Arthur L.; and Benslay, Roger M., 3,647,910.
Standard Tool & Manufacturing Co.: *See—*
Zilahy, Zoltan E.; and Dato, Anthony L., 3,646,656.
Standard-Havens, Inc.: *See—*
Rheinfrank, Lamson, Jr., 3,647,047.
Stanford Research Institute: *See—*
Benson, Sidney W.; Haugen, Gilbert R.; and Jackson, Roland S., 3,647,387.
Stange, Hugo, to FMC Corporation. Method for dispersing fog with phosphate salt compositions. 3,647,710, Cl. 252-319.
Stansell, Marion J.; and Stansell, Shelby J., said Stansell, Marion J., assor. to United States of America, Air Force. Portable, self-contained system for analyzing biological fluids or the like. 3,648,159, Cl. 324-30.
Stansell, Shelby J.: *See—*
Stansell, Marion J.; and Stansell, Shelby J.,3,648,159.
Starck, Hermann C., Berlin: *See—*
Restelli, Attilio, 3,647,420.
Startman, Paul E., to Parker-Hannifin Corporation. Coupling device for permitting coupling under trapped pressure. 3,646,964, Cl. 137-614.03
Stauffer-Wacker Silicone Corporation: *See—*
Hutchinson, William Earl, 3,647,741.
Stayner, Robert A.; and DeMay, George B., to Chevron Research Company. Electrical discharge machining process and dielectric fluid. 3,648,013, Cl. 219-69.
Stead, Cecil Vivian: *See—*
Andrew, Herbert Francis; and Stead, Cecil Vivian,3,647,778.
Stearns, Charles F.: *See—*
Colman, Michael E.; and Stearns, Charles F.,3,646,753.
Steele Chemicals Company Limited: *See—*
Kruger, Gunther, 3,647,829.
Steigerwald, Karl Heinz. Method and device for inspecting and/or controlling thermally produced mechanical joints. 3,648,009, Cl. 219-121.
Steiman, Wolf, to VCA Corporation. Mixing valve for dispensers. 3,647,120, Cl. 222-402.22
Stein, Howard: *See—*
Thron, John E.; Woods, William E.; Bellettiere, Ronald; and Stein, Howard,3,648,252.
Stein, Michel Guy Pierre, to Societe Anonyme Telecommunications Radioelectriques et Telephoniques, T.R.T. Telegraphy receiver for harmonic telegraphy. 3,647,967, Cl. 178-88.
Stein, Reinhardt P.; Smith, Robert C., Jr.; and Smith, Herchel, to American Home Products Corporation. Preparation of steroidal formate esters. 3,647,784, Cl. 260-239.55
Stein, Sam, Associates, Inc.: *See—*
Johnson, Richard T., 3,647,189.
Steiner, Walter. Extensible clothes hanging device. 3,647,073, Cl. 211-1.3
Stenger, Vernon A.; and Kramer, Walter R., to Dow Chemical Company, The. Process for solution mining of silver. 3,647,261, Cl. 299-4.
Stepanek, Roy W., to Pettibone Corporation. Crusher. 3,647,150, Cl. 241-75.
Stephens, Charles R.: *See—*
Beereboom, John J.; Cameron, Donald P.; and Stephens, Charles R.,3,647,479.
Stephens, Thomas M., to Dohrmann Instruments Company. Solid sampler, apparatus and method. 3,647,385, Cl. 23-230.
Sterlicchi, Helen; and Sterlicchi, Pasquale J. Surface projectile game board having interchangeable scoring board members. 3,647,215, Cl. 273-123.
Sterlicchi, Pasquale J.: *See—*
Sterlicchi, Helen; and Sterlicchi, Pasquale J.,3,647,215.
Sterling Drug Inc.: *See—*
Ackerman, James H., 3,647,864.
Collins, Joseph C., 3,647,782.
Kirchner, Freddrick K., 3,647,819.
Matthiesen, Albert H., 3,647,687.
Stermac, Boris, to Premium Forest Products Limited. Adjustable journalling means. 3,646,635, Cl. 16-129.
Stern, Charles: *See—*
Reader, Malcolm; Tregay, John L.; and Stern, Charles,3,647,955.
Stevens, George D. Packaged composition for enhancing the growth of plants. 3,647,411, Cl. 71-1.
Stevens, Harry R.: *See—*
Palmason, Einar H.; and Stevens, Harry R.,3,646,879.
Stevens, John J., Jr., to Union Carbide Corporation. Treatment of alumina fillers with silane coupling agents for epoxy resins. 3,647,742, Cl. 260-37.
Stiles, Phillip J.: *See—*
Howard, Webster E., Jr.; Ludeke, Rudolf; and Stiles, Phillip J.,3,648,124.
Stine, George H., to General Mills Fun Group, Inc., mesne. Model rocket and shock cord retainer therefor. 3,646,887, Cl. 102-34.5
Stinson, William S., Jr.: *See—*
Dame, Charles, Jr.; Stinson, William S., Jr.; and Capossela, Anthony C.,3,647,474.
Stockmann, Hans H.; and Ray-Chaudhuri, Dilip K., to National Starch and Chemical Corporation. Chain extended polyamine resin compositions. 3,647,763, Cl. 260-78.
Stone Conveyor Co., Inc.: *See—*
Didas, Ronald E., 3,647,051.
Stoof, Gerhard: *See—*
Meyer, Erwin; Brendel, Klaus-Dieter; Blau, Hans; and Stoof, Gerhard,3,647,022.
Stowell, Keith Christopher; and Howlett, Peter Michael, to A.B.M. (Malting) Limited. Malting grain. 3,647,473, Cl. 99-52.
Strakhov, Valery Ivanovich: *See—*
Kostin, Konstantin Fedorovich; Sapunov, Georgy Konstantinovich; Svirin, Alvian Afanasievich; Strakhov, Valery Ivanovich; and Shur, Grigory Iosifovich,3,648,091.
Strang, Herman D. Garment hanger lock mechanism. 3,647,072, Cl. 211-4.
Strategic Metals Research, Inc.: *See—*
Grosbard, Gregory, 3,648,242.
Stratton, George B.: *See—*
Geering, Emil J.; and Stratton, George B.,3,647,885.
Straus, Alan E., to Chevron Research Company. Linear alkylbenzene compositions. 3,647,899, Cl. 260-668.
Streeter, Maurice W. Crutch with retractable ice gripper. 3,646,949, Cl. 135-58.
Strickland, William T., Jr.: *See—*
Hamby, Tyler W., Jr.; and Strickland, William T., Jr.,3,646,999.
Stringer, Donald Charles: *See—*
Beardmore, Alfred Cyril; Cooke, Geoffrey Cyril; and Stringer, Donald Charles,3,647,010.
Strohmaier, Alfred J., to Du Pont de Nemours, E. I., and Company. False twisted ribbons. 3,646,747, Cl. 57-140.
Stromberg-Carlson Corporation: *See—*
Qualich, Amedeo, 3,646,668.

Strong, Larry J.: *See—*
Rollen, Wayne N.; Strong, Larry J.; and Rolen, Hurschel H.,3,648,146.

Stuby, Kenneth P., to International Business Machines Corporation. Hour-glass shaped conductive connection through semiconductor structures. 3,648,131, Cl. 317-235.

Stucki, Peter: *See—*
Closs, Felix H.; Seitzer, Dieter; and Stucki, Peter,3,647,949.

Stuetz, Dagobert E.: *See—*
Gump, Klaus H.; and Stuetz, Dagobert E.,3,647,770.

Sturm, Hans Juergen, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Production of cyanoacetaldehyde. 3,647,854, Cl. 260-465.1

Sturzinger, Oskar Edwin. System for ascertaining the accumulation of pulverulent, granular or flaky bulk goods. 3,647,301, Cl. 356-103.

Sud-Aviation Societe Nationale de Constructions Aeronautiques: *See—*
Denis, Andre Maxime Philippe; and Ripart, Guy Marie, 3,648,157.

Sudar, Seymour: *See—*
Wetch, Joseph R.; Sudar, Seymour; and Bienvenue, Louis L.,3,647,394.

Suenaga, Masanobu; Machii, Tetsuo; Sawano, Takahiro; Kobayashi, Takehiko; Dengo, Tadao; and Nakai, Tetsuzo, to Tokyo Shibaura Electric Co., Ltd. Laminated semiconductor structure. 3,648,121, Cl. 317-234.

Sugahara, Yoshimasa: *See—*
Mukai, Hisakazu; Kindo, Hideaki; Sugahara, Yoshimasa; and Yamagata, Akinori,3,648,064.

Sugiyama, Naohisa: *See—*
Nagai, Haruo; and Sugiyama, Naohisa,3,647,729.

Sulkowki, Theodore S.; and Mascitti, Albert A., to American Home Products Corporation. α-Imino-2-toluic acids. 3,647,865, Cl. 260-518.

Sullivan, Wayne A.; and Scolaro, Donald A., to Bendix Corporation, The. Gated variable polarity reversing ramp generator. 3,648,067, Cl. 307-228.

Sullivan,James D.: *See—*
Gieseking, Carl W.; and Sullivan,James D.,3,647,752.

Sumilas, John W.: *See—*
Hoffman, William K.; and Sumilas, John W.,3,648,063.

Sumitomo Chemical Co., Ltd.: *See—*
Ito, Ken; Kaminaka, Hiroshi; Kotera, Norio; Yamamoto, Shinji; Dohgane, Iwao; Shigehiro, Kosuke; Kuruma, Hiroshi; Chinuki, Takashi; Yoshitake, Hiroshi; Tanimoto, Kenji; Hasegawa, Shinichi; and Kobayasi, Nobuki, 3,647,866.

Sumitomo Chemical Company, Ltd.: *See—*
Arasaki, Seitetsu; Yamamoto, Hisao; and Inaba, Shigeho, 3,647,785.
Nakaguchi, Kohei; Kawasumi, Shohachi; Hirooka, Masaaki; Yabuuchi, Hiroshi; and Takao, Hiroyoshi, 3,647,753.
Nakaguchi, Kohei; Kawasumi, Shohanchi; Hirooka, Masaaki; and Yabuuchi, Hiroshi, 3,647,771.
Nomura, Kazuhumi; Nakazato, Kunio; and Matsui, Hideki, 3,647,374.
Ohrui, Tetsuya; and Sakakibara, Yasuhito, 3,647,376.
Sigiyama, Hiroshi; Ikeda, Takuo; and Itani, Takashi, 3,647,827.

Sumitomo Electric Industries, Ltd.: *See—*
Nakahara, Tsuneo; Kurauchi, Noritaka; and Kitani, Hiroshi, 3,648,172.

Summerlin, Frederick Arthur: *See—*
Sanders, John Stewart; Savage, Donald Stanley; and Summerlin, Frederick Arthur,3,646,757.

Sun Oil Company: *See—*
Kirk, Merritt C., Jr.; and Dobson, Ernest W., 3,647,679.
Lyons, James E., 3,647,896.
Shawhan, Elbert N., 3,648,165.

Sun, Theresa I.: *See—*
Herd, Harold H.; and Sun, Theresa I.,3,647,456.

Sundby, Gustav B., to Rockwell Manufacturing Company. Resilient railway car trunk. 3,646,893, Cl. 105-182.

Sunden, Nils B., to Perstorp AB. Method for the production of decorative laminates having low tendency to flame-spreading. 3,647,595, Cl. 156-331.

Sunkist Growers, Inc.: *See—*
Swisher, Horton E., 3,647,476.

Surash, John J.; Giorgianni, Edward J.; and Hotter, Lynn R., to Eastman Kodak Company. Methods and materials for replenishment of developers for color photographic films. 3,647,461, Cl. 96-66.

Surash, John J.; Giorgianni, Edward J.; and Hotter, Lynn R., to Eastman Kodak Company. Methods and materials for replenishment of developers for color photographic films (B). 3,647,462, Cl. 96-66.

Sury, Ernst: *See—*
Rossi, Alberto; and Sury, Ernst,3,647,791.

Sushkov, Alexandr Fedorovich: *See—*
Berzin, Gunard Valdemarovich; Kalnin, Arvid Yanovich; Sushkov, Alexandr Fedorovich; Skrupsky, Voldemar Petrovich; Ziemelis, Andris Eduardovich; Soloviev, Boris Fedorovich; Leeniex, Karl Mikhailovich; Sovetin, Vladimir Kirilovich; Gulbis, Yan Karlovich; Dalbinsh, Yan Yanovich; Priede, Bruno Andreevich; Upman, Karl Kristapovich; Muzhits, Vitold Iosifovich; Junga, Yan Petrovich; Krogzem, Ivar Arnoldovich; Greitan, Zigurd Boleslavovich; and Rotsen, Karl Arturovich,3,646,687.

Suttle, Theodore: *See—*
Morgan, Harvey E.; Suttle, Theodore; and Schenck, Jackson C.,3,646,984.

Suzuki, Eizo: *See—*
Okamoto, Kazuo; Eguchi, Naoki; Sakao, Nasuo; Honda, Ichiro; and Suzuki, Eizo,3,647,571.

Suzuki, Hidemasa: *See—*
Kondo, Eiroku; Usuda, Hirotaka; Suzuki, Hidemasa; and Furuya, Tuneo,3,647,981.

Suzuki, Hideo; Ozawa, Yoshiko; and Tanabe, Osamu, to Industrial Science and Technology, Agency of. Method of reducing raffinose content of beet molasses. 3,647,625, Cl. 195-11.

Suzuki, Kozaburo: *See—*
Seki, Toshio; Suzuki, Kozaburo; and Matsuzaki, Takashi,3,647,746.

Suzuki, Kunimoto: *See—*
Matsushita, Toru; Suzuki, Kunimoto; and Hasegawa, Shoji,3,647,531.

Suzuki, Masaru, to Kabushiki-Kaisha Tokai Denki Seisakushe. Passing signals for automobiles. 3,648,101, Cl. 315-82.

Suzuki Metal Industry Co., Ltd.: *See—*
Okamoto, Kazuo; Eguchi, Naoki; Sakao, Nasuo; Honda, Ichiro; and Suzuki, Eizo, 3,647,571.

Suzuki, Satoshi: *See—*
Maeda, Yo; Suzuki, Satoshi; Nakamura, Yoshiharu; Masubuchi, Yorimitu; Ueyama, Tamotsu; Fukutomi, Naoki; and Takahashi, Hiroshi,3,646,670.

Suzuki, Shigeto, to Chevron Research Company. Process for the production of meta benzene disulfonyl chlorides. 3,647,870, Cl. 260-543.

Suzuki, Yasuhiro; Ikegami, Renpei; and Kishimoto, Takuo, to Mitsubishi Jukogyo Kabushiki Kaisha. Automatic tool exchanger. 3,647,090, Cl. 214-1.

Svardal, Per S.: *See—*
Bergum, Bernard C.; and Svardal, Per S.,3,647,586.

Svirin, Alvian Afanasievich: *See—*
Kostin, Konstantin Fedorovich; Sapunov, Georgy Konstantinovich; Svirin, Alvian Afanasievich; Strakhov, Valery Ivanovich; and Shur, Grigory Iosifovich,3,648,091.

Svoboda, Vlastimil: *See—*
Kadera, Vaclav; Novotny, Josef; Vondruska, Miloslav; Feierfeil, Jiri; Svoboda, Vlastimil; Misarek, Dusan; Futera, Miroslav; Nacovska, Katerina; Janc, Zbynek; Nemec, Adolf; Penkava, Jiri; and Vitkovec, Zdenek,3,647,312.

Svoronos, Jason, to Eleusis Bauxite Mines Mining Industrial & Shipping Inc. Method of recovering alumina from alunite and aluminosilicate materials. 3,647,372, Cl. 23-142.

Swanson, John W.; Hartman, David A.; Beers, Russel L.; and Jamieson, Ernest J., to Cities Service Oil Company. Lubricating oil composition. 3,647,694, Cl. 252-51.5

Swartz, Leonard B., to Oxygen Valve Company of America. Gas supply connector and regulator valve. 3,646,965, Cl. 137-614.06

Sweeney, Richard F.: *See—*
Anello, Louis G.; Sweeney, Richard F.; and Litt, Morton H.,3,647,887.
Anello, Louis G.; Sweeney, Richard F.; and Litt, Morton H.,3,647,889.

Sweeney, Thomas E. Foldable semi-rigid airfoil for airborne vehicles. 3,647,163, Cl. 244-49.

Sweeney, William M.; and Bialy, Jerzy J., to Texaco Inc. Thermally stable jet fuel composition. 3,647,404, Cl. 44-62.

Swered, Paul: *See—*
Shema, Bernard F.; Brink, Robert H., Jr.; and Swered, Paul,3,647,703.

Swern, Daniel: *See—*
Silbert, Leonard S.; and Swern, Daniel,3,647,893.

Swisher, Horton E., to Sunkist Growers, Inc. Limonin free naval orange juice and drink of milk embodying such orange juice. 3,647,476, Cl. 99-105.

Swisher, James H.: *See—*
Fuchs, Edward O.; and Swisher, James H.,3,647,573.

Swiss Aluminium, Ltd.: *See—*
Hofling, Erich; and Breu, Hanspeter, 3,647,658.
Wolf, Emanuel, 3,647,590.

Sylvania Electric Products, Inc.: *See—*
Andrade, Philip; and Rychlewski, Thaddeus V., 3,647,941.
Foster, Jack D.; and Osterink, Larry M., 3,648,193.
Lagos, Costas, 3,647,706.

Symons Corporation: *See—*
Pipala, Dennis R., 3,647,173.

Syntex Corporation: *See—*
Cross, Alexander D., 3,647,806.
Ginsig, Robert, 3,647,831.

Syntron (Canada) Limited: *See—*
Krajewski, Werner; and Nahirny, John, 3,648,136.

Szupillo, Raymond E., to Corning Glass Works. Chromium filmed glass articles and method for making the same. 3,647,566, Cl. 148-6.3

Taber, Robert C.; and Koller, James E., to Eastman Kodak Company. Direct-positive photographic elements containing multiple layers. 3,647,463, Cl. 96-68.

Taber, Robert C.; and Russell, William H., to Eastman Kodak Company. Photographic elements and means for rapid processing of photographic elements. 3,647,459, Cl. 96-66.5

Tagliafico, Giovan Battista; and Grazzini, Ferdinando, to Minnesota Mining and Manufacturing Company. Solarization of silver halide photographic emulsions. 3,647,458, Cl. 96-45.2

Taiho Kogyo Co., Ltd.: *See—*
Mizuno, Koichi, 3,647,500.

Taira, Akio, to Olympus Optical Co., Ltd. Wide angle flat field microscopic objective of low power. 3,647,282, Cl. 350-225.

Tait, Thomas. Vegetable processing machine. 3,646,978, Cl. 146-83.

Takacs, Kalman: *See—*
Harsanyi, Kalman; Reiter, Jozsef; Korbonits, Dezso; Gonczi, Csaba; Takacs, Kalman; Bako, Erzsebet; Leszkovszky, Gyorgy; Tardos, Laszlo; and Vertesy, Csaba,3,647,809.

Takahashi, Hiroshi: *See—*
Maeda, Yo; Suzuki, Satoshi; Nakamura, Yoshiharu; Masubuchi, Yorimitu; Ueyama, Tamotsu; Fukutomi, Naoki; and Takahashi, Hiroshi,3,646,670.

Takahashi, Susumu: *See—*
Ikegami, Kazutoshi; Ikeda, Hideo; Takeuchi, Kazumi; Kitamura, Kosuke; and Takahashi, Susumu,3,648,179.

Takahashi, Yasunobu: *See—*
Seko, Maomi; Takahashi, Yasunobu; Iwamoto, Takeaki; and Seno, Shikazo,3,647,855.

Takao, Hiroyoshi: *See—*
Nakaguchi, Kohei; Kawasumi, Shohachi; Hirooka, Masaaki; Yabuuchi, Hiroshi; and Takao, Hiroyoshi,3,647,753.

Takasawa, Seigo: *See—*
Tanaka, Masao; Nakamura, Nobuo; and Takasawa, Seigo,3,647,627.

Takata, Toshikatsu: *See—*
Watanabe, Jun; Hosoi, Susumu; Kuwazaki, Masahiro; Ota, Akira; Takata, Toshikatsu; and Asaoka, Junichi,3,647,552.

Takatori, Toshimitsu: *See—*
Okada, Toru; and Takatori, Toshimitsu,3,647,933.

Takayama, Masayuki: *See—*
Murato, Kenichi; Takei, Kenji; and Takayama, Masayuki,3,646,891.

Takehisa, Masaaki; Kawakami, Waichiro; Nakajima, Hayato; and Hosaki, Yoshihiko, to Japan Atomic Energy Research Institute. Method of reducing pressure and controlling flow rate of a fluid under high pressure. 3,646,950, Cl. 137-13.

Takei, Kenji: *See—*
Murato, Kenichi; Takei, Kenji; and Takayama, Masayuki,3,646,891.

Takemoto, Takeo; Miyata, Yoshihiko; and Kawamura, Takao, to Hitachi, Ltd. Implosion-proof cathode-ray tube and method of making same. 3,647,960, Cl. 178-7.8

Takeuchi, Kazumi: *See—*
Ikegami, Kazutoshi; Ikeda, Hideo; Takeuchi, Kazumi; Kitamura, Kosuke; and Takahashi, Susumu,3,648,179.

Takeuchi, Masao: *See—*
Yamagishi, Hidehisa; Gunji, Naoki; and Takeuchi, Masao,3,647,650.

Takiyama, Keiichi: *See—*
Imai, Masaya; Izubayashi, Masuji; Takiyama, Keiichi; Hirai, Mitsuo; and Nikki, Masao,3,647,904.

Taks, Gerardus J. J. M.: *See—*
Kaasenbrood, Petrus J. C.; and Taks, Gerardus J. J. M.,3,647,872.

Talbert, David Godwin, to S. E. Laboratories(Holdings) Limited. Oscilloscopes utilizing video signals to modulate the beam with varying deflection periods. 3,648,098, Cl. 315-26.

Talmadge, Arthur. Record rack. 3,647,074, Cl. 211-40.

Tanabe, Isao, to Japan Metals and Chemicals Company Limited. Method of producing manganese dioxide. 3,647,375, Cl. 23-145.

Tanabe, Osamu: *See—*
Suzuki, Hideo; Ozawa, Yoshiko; and Tanabe, Osamu,3,647,625.

Tanabe Seiyaku Co., Ltd.: *See—*
Watanabe, Toshio; Tsukamoto, Goro; Hayashi, Kimiaki; Sato, Masanori; and Iwasawa, Yoshio, 3,647,799.

Tanaka, Eihachiro; Fukuda, Takeji; Yamaji, Kenkichi; Miyake, Yasuhiko; Ota, Hiroshi; and Kimura, Katsuo, to Hitachi Cable Limited. Process for the manufacturing of composite metal wire. 3,646,796, Cl. 72-258.

Tanaka, Masao; Nakamura, Nobuo; and Takasawa, Seigo, to Kyowa Hakko Kogyo Co., Ltd. Process for producing flavin-adenine dinucleotide. 3,647,627, Cl. 195-28.

Tang, Donald T.: *See—*
Kobayashi, Hisashi; and Tang, Donald T.,3,648,265.

Tang, Donald T., to International Business Machines Corporation. Run-length-limited coding for modified raised- cosine equalization channel. 3,647,964, Cl. 178-68.

Tanguay, Jean-Paul; and Elie, De Roberval, to Placements Jean Paul Tanguay Limitee. Conveyor. 3,647,046, Cl. 198-127.

Tanimoto, Kenji: *See—*
Ito, Ken; Kaminaka, Hiroshi; Kotera, Norio; Yamamoto, Shinji; Dohgane, Iwao; Shigehiro, Kosuke; Kuruma, Hiroshi; Chinuki, Takashi; Yoshitake, Hiroshi; Tanimoto, Kenji; Hasegawa, Shinichi; and Kobayasi, Nobuki,3,647,866.

Tanimura, Shigeru: *See—*
Yamamoto, Mititake; Uekusa, Genzo; Tanimura, Shigeru; and Maejima, Norio,3,648,117.

Tanner, Howard C.: *See—*
Davis, William H.; Hornung, Louis M.; Lindsey, Royce D.; and Tanner, Howard C.,3,647,041.

Tap, Henry H., to Oak Electro/Netics Corporation. Fine tune mechanism. 3,646,823, Cl. 74-10.45

Tappan Company, The: *See—*
Perl, Richard L., 3,646,927.

Tardos, Laszlo: *See—*
Harsanyi, Kalman; Reiter, Jozsef; Korbonits, Dezso; Gonczi, Csaba; Takacs, Kalman; Bako, Erzsebet; Leszkovszky, Gyorgy; Tardos, Laszlo; and Vertesy, Csaba,3,647,809.

Tate, David P.: *See—*
Webb, Frederick J.; and Tate, David P.,3,647,774.

Tate, Malcolm C.: *See—*
Bradley, Chester D.; and Tate, Malcolm C.,3,646,854.

Tateisi, Kazuma; Mizuta, Yukio; and Shizuya, Kyoto, to Omron Tateisi Electronics Co. Automatic deposit receiving and cash dispensing system. 3,648,020, Cl. 235-61.7

Tatsumi, Masanori; and Abe, Hisao, to Toray Industries, Inc. Liquid-vapor phase oxidation method for producing dialkyl sulfoxides. 3,647,884, Cl. 260-607.

Tatum, William C.: *See—*
Putnam, David T.; and Tatum, William C.,3,647,582.

Taylor, Lockhart: *See—*
Shepherd, Alexander Turnbull,; Smith, Laurence Philip; and Taylor, Lockhart,3,648,030.

Taysom, Patrick Arnold; Lewis, Brian Mark; and Kittel, Clive Francis, to International Standard Electric Corporation. Cantilevered spring pressure measurement and adjustment. 3,646,810, Cl. 73-161.

Teagno, Wladimiro, to AMP Incorporated, mesne. Fuse unit having slidable fuse-receiving drawer. 3,648,115, Cl. 317-101.

Technical Operations, Incorporated: *See—*
Buck, Willard E.; and Holland, Thomas E., 3,647,956.

Technicon Corporation: *See—*
Adler, Stanford L., 3,647,070.
Beaver, Murray W., 3,648,160.

Technicon Instruments Corporation: *See—*
Dannewitz, Robert E.; and Luongo, Albert M., 3,647,187.

Tecumseh Products Company: *See—*
Janisch, Douglas G., 3,646,667.

Teijin Limited: *See—*
Hara, Shigeyoshi; Senoo, Masao; Yoshida, Tsunemasa; and Uchida, Moriya, 3,647,762.
Koizumi, Takao; and Kajita, Takao, 3,646,646.

Teledyne-Mid America Corporation: *See—*
Church, Herman S., 3,647,180.

Teledyne, Inc.: *See—*
Mankovitz, Roy J., 3,648,075.
Wiesler, Mordechai, 3,648,169.

Telefonaktiebolaget LM Ericsson: *See—*
Sahlgren, Rolf Ake; and Wiljanen, Bo Ingvar, 3,646,826.

Telefunken Patentverwertungsgesellschaft m.b.H.: *See—*
Gissel, Hans, 3,648,201.

Teletype Corporation: *See—*
Cless, Gerhard, 3,647,036.

Temperilli, Aldemio: *See—*
Bernardi, Luigi; Bosisio, Germano; and Temperilli, Aldemio,3,647,655.

Tenneco Chemicals, Inc.: *See—*
Brook, John W.; and Hoch, Samuel, 3,647,748.
Walker, David G.; and Keyworth, Donald A., 3,647,843.

Tenneco Oil Company: *See—*
Rowley, Kermit G.; and Barron, Richard H., 3,647,000.

Teraoka, Tatsuo. Device for manufacturing a helically preformed element. 3,646,793, Cl. 72-137.

Terman, Lewis Madison, to International Business Machines Corporation. Three-phase dynamic shift register. 3,648,066, Cl. 307-221.

Terresearch Limited: *See—*
McLean, Peter; and Wilkins, John William, 3,647,319.

Tetra Tech, Inc.: *See—*
Winslow, John S., 3,646,863.

Teurnier, Roger, to C.I.T.-Compagnie Imdustrielle des Telecommunication. Apparatus for connecting transmission channels. 3,647,966, Cl. 178-70.

Tew, Walter Hosey, Jr., to General Electric Company. Symmetrical function generator. 3,648,037, Cl. 235-197.

Texaco Inc.: *See—*
Crookshank, Fred T., 3,647,693.
Cross, Edward A., 3,647,690.
Curtice, Beverly A.; and Harnsberger, Bobby G., 3,646,998.
Nolting, Jerry L.; and Rouse, Alan D., 3,646,802.
Sweeney, William M.; and Bialy, Jerzy J., 3,647,404.

Texas Instruments, Incorporated: *See—*
Burns, Carmen D., 3,647,445.
Cunningham, James A.; Fuller, Clyde R.; and Wood, Samuel J., Jr., 3,647,663.
Dyer, Lawrence D., 3,647,530.
Dyer, Lawrence D., 3,647,561.
Gruczelak, Norman P.; and Pierce, Joe T., 3,648,264.
Merryman, Jerry Dale,, 3,648,097.
Rice, Stanley B., Jr., 3,647,534.

Textilana Corporation: *See—*
Ernst, Robert, 3,647,868.

Textron Inc.: *See—*
Reynolds, Rolfe E.; and Spencer, Louis L., 3,646,899.

Thate, Kurt; and Muller, Jurgen, to Agfa-Gevaert Aktiengesellschaft. Apparatus for wet treatment of films or the like. 3,647,596, Cl. 156-345.

Theimer, Ernst T.: *See—*
Evers, William J.; Katz, Ira; Wilson, Richard A.; and Theimer, Ernst T.,3,647,792.

Thermal Process Engineering Company: *See—*
Norris, James D., 3,646,880.

Thiokol Chemical Corporation: *See—*
Bertozzi, Eugene R., 3,647,766.

Thomas, Edmond Joseph, to Bell Telephone Laboratories, Incorporated. Adaptive echo canceller for nonlinear systems. 3,647,992, Cl. 179-170.2

Thomas, John C. Battery operated fanning device. 3,647,323, Cl. 417-234.

Thomas, Wilford H.: *See—*
Williams, Kenneth C.; and Thomas, Wilford H.,3,647,838.

Thompson, Edward R., to Lockheed Aircraft Corporation. Photographic reproduction of halftone screens. 3,647,471, Cl. 96-116.

Thompson, Francis T.: *See—*
Booker, Clyde A., Jr.; and Thompson, Francis T.,3,647,953.
Booker, Clyde A., Jr.; and Thompson, Francis T.,3,647,954.

Thompson, John R., to Electronic Industrial Engineering, Inc. Co-axial switch. 3,648,000, Cl. 200-153.

Thompson, John: *See—*
Fitzpatrick, Hugh M.; Neville, James J.; Thompson, John; and Boggs, Fitzhugh W.,3,648,226.

Thompson, Robert H., to Van Dorn Company. Apparatus for controlling an injection molding machine. 3,647,309, Cl. 425-139.

Thompson, William L.: *See—*
Martin, John C.; and Thompson, William L.,3,646,815.

Thomson-CSF: *See—*
Deman, Pierre; and Gouyet, Jean Pierre, 3,648,248.
Yeou, Ta, 3,648,198.

Thoonen, Theodorus J., to Verenigde Kunstmestfabrieken Mekog-Albatros N.V. Process for the preparation of anhydrous aluminium fluoride. 3,647,366, Cl. 23-83.

Thorpe, Richard S.: *See—*
Lubowitz, Hyman R.; Kendrick, William P.; Jones, John F.; Thorpe, Richard S.; and Burns, Eugene A.,3,647,529.

Thron, John E.; Woods, William E.; Bellettiere, Ronald; and Stein, Howard, to Honeywell Inc. Multiprogrammable, multiprocessor computer system. 3,648,252, Cl. 340-172.5

Thubeauville, Heinz: *See—*
Niedner, Peter; Diez, Gerhard; and Thubeauville, Heinz,3,647,357.

Tilbrook, Kenneth B., to Certain-Teed Products Corporation. Glass fiber cooling means made of palladium. 3,647,382, Cl. 65-12.

Tillman, James J.: *See—*
Gagnon, Donald W.; and Tillman, James J.,3,647,510.

Tillmann, Hans Peter; and Lerchs, Erik, to Burndy Corporation. Multilayer programmable wiring board. 3,648,221, Cl. 339-74.

Timm, Gerald W.; and Bradley, William E., to University of Minnesota, The Regents of the. Implantable electronic stimulator electrode and method. 3,646,940, Cl. 128-421.

Timmler, Helmut: *See—*
von Konig, Anita; and Timmler, Helmut,3,647,451.

Tims, Jerry L.; and Hubbard, Vance M., to Precept, Incorporated. Sanitary shoe cover. 3,648,109, Cl. 317-2.

Tishken, Paul, to Tishken Products Co. Method for cold rolling grating workstock. 3,646,794, Cl. 72-187.

Tishken Products Co.: *See—*
Tishken, Paul, 3,646,794.

Titangesellschaft mbH: *See—*
Hilgers, Giovanni; Hitzemann, Gerhard; and Kulling, Achim, 3,647,377.

Titus, Joseph S.: *See—*
Buttweiler, Thomas B.; and Titus, Joseph S.,3,648,056.

Tiura, George O., to AgMac Inc., mesne. Plant positioner for harvesters. 3,646,738, Cl. 56-314.

Todd, Hoyt H.; McIntyre, John F.; and Lewis, Le Roy, to Ametek, Inc. Nitriding process. 3,647,572, Cl. 148-16.6

Toepfl, Rosemarie: *See—*
Deflorin, Alberto; Abel, Heinz Reinach; Berger, Alfred; Casty, Richard; and Toepfl, Rosemarie,3,647,728.

Tokico Limited: *See—*
Katsumori, Teiji, 3,647,239.

Tokuyama Soda Kabushiki Kaisha: *See—*
Mizutani, Yukio; Yamane, Reiichi; Sata, Toshikatsu; and Izuo, Ryuji, 3,647,086.

Tokyo Shibaura Electric Co., Ltd.: *See—*
Kabuki, Kimiaki; and Murai, Bunjiro, 3,647,727.
Kitamura, Hiroyuki, 3,648,087.
Kuwabara, Takeo; Morimoto, Kazumi; and Miyao, Hachiro, 3,648,212.
Matsushita, Toru; Suzuki, Kunimoto; and Hasegawa, Shoji, 3,647,531.
Suenaga, Masanobu; Machii, Tetsuo; Sawano, Takahiro; Kobayashi, Takehiko; Dengo, Tadao; and Nakai, Tetsuzo, 3,648,121.
Yokota, Ryosuke; and Muto, Yuhei, 3,648,049.

Toledo, Emil; and Sprague, Dennis R., to Raytheon Company. Beryllium copper electropolishing solution. 3,647,654, Cl. 204-140.5

Tollefson, Charles I.; and Bice, Claude W., to French, R. T., Company, The. Method of preparing canned cooked rice. 3,647,486, Cl. 99-186.

Toma, Setsuo, to Nissan Jidosha Kabushiki Kaisha. Clutch with centrifugal dump valve. 3,647,037, Cl. 192-106.

Tonka Corporation: *See—*
Adickes, Cecil F., 3,646,706.

Tool Research & Engineering Corporation: *See—*
Nolin, Roger J.; and Brizzi, Anthony F., 3,647,252.

Topham, Arthur: *See—*
Bagai, Satish Kumar; and Topham, Arthur,3,647,496.

T. O. Plastics: *See—*
Paulsen, Glen E., 3,646,684.

Toppan Printing Company, Limited: *See—*
Mizutani, Takashi; Anzai, Masao; and Ebihara, Akio, 3,647,503.

Toray Industries, Inc.: *See—*
Tatsumi, Masanori; and Abe, Hisao, 3,647,884.

Torrington Company, The: *See—*
Ashmead, Albert S.; and Shepard, Richard W., 3,647,057.

Toy, Raymond M.: *See—*
Chang, Richard S.; Cutler, Stanley; La Branche, Harvey W.; Pearlman, Marshall B.; Ryan, John W.; and Toy, Raymond M.,3,647,927.

Toyo Kogyo Co., Ltd.: *See—*
Gomada, Nobuyasu; and Kosaka, Genzo, 3,647,577.

Toyoda Koki Kabushiki Kaisha: *See—*
Oishi, Kenzaburo; and Toyozumi, Osamu, 3,646,711.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Baba, Takashi; and Matsuoka, Chikara, 3,647,249.
Ito, Shin; Kubo, Seitoku; and Mori, Takakazu, 3,646,835.
Kubo, Seitoku; Ohnuma, Kiyoshi; and Hirosawa, Koichiro, 3,646,836.

Toyozumi, Osamu: *See—*
Oishi, Kenzaburo; and Toyozumi, Osamu,3,646,711.

Tracor, Inc.: *See—*
Lester, William W., 3,647,665.

Trammell, James R., to Scanfax Systems Corporation. Cassette recording system using notched cassettes. 3,647,987, Cl. 179-100.2

Trane Company, The: *See—*
Falk, George L.; and Jones, Daniel F., 3,646,773.

Trautvetter, Werner: *See—*
Buning, Robert; Bernhardt, Gunther; Bierwirth, Egon; and Trautvetter, Werner,3,647,402.

Tregay, John L.: *See—*
Reader, Malcolm; Tregay, John L.; and Stern, Charles,3,647,955.

Treiber, Robert L., to Alcor Chemical Corporation. Method and composition for sealing anodized aluminum surfaces. 3,647,649, Cl. 204-35.

Tremblay, Hubert J.: *See—*
Harper, Kenneth B.; and Tremblay, Hubert J.,3,648,143.

Trewella, Robert J., to Wyomissing Corporation. Combined package and winder for roll type bandages. 3,647,152, Cl. 242-60.

Triatex International AG fur textile Forschung und Entwicklung: *See—*
Calzaferri, Hans; Kunz, Werner; Schwemmer, Martin W.; and Wyler, Max, 3,647,353.

Trimble, Cebern B., to National Cash Register Company, The. Magnetic rod read only memory. 3,648,261, Cl. 340-174.

Trio Machine and Manufacturing Company, Inc.: *See—*
Mackey, Charles L., 3,647,238.

Triumph Werke Nuermberg A.G.: *See—*
Waldenburger, Hermann; and Decker, Herbert, 3,647,040.

Trneny, Jaromir: *See—*
Mysik, Stanislav; and Trneny, Jaromir,3,647,723.

Troiano, Paul F.: *See—*
Menashi, Jameel; and Troiano, Paul F.,3,647,685.

Troth, Dennis L.: *See—*
Sherman, Warren S.; Troth, Dennis L.; and Bennett, William A.,3,646,755.

Troutner, Arthur L. Heavy duty pitched truss and ridge connector therefor. 3,646,725, Cl. 52-641.

Troxler, Franz: *See—*
Petrzilka, Theodor; Hofmann, Albert; Schenk, Hansruedi; Troxler, Franz; Frey, Albert; and Ott, Hans,3,647,801.

Truppe, Meinhard; Schernthaner, Matthias; and Poferl, Gunter, to Vereinigte Osterreischische Eisen-und Stahlwerke Aktiengesellschaft. Measuring device for continuously measuring the temperature of metal baths. 3,647,559, Cl. 136-234.

Truppe, Meinhard; Schernthaner, Matthias; and Poferl, Gunter, to Vereinigte Osterreichische Eisen-und Stahlwerke Aktiengesellschaft. Measuring lance for continuously measuring the temperature of metal baths. 3,647,560, Cl. 136-234.

Truxa, Leslie, to Dominion Engineering Works, Limited. Drainage foil for a papermaking machine. 3,647,620, Cl. 162-211.

TRW Inc.: *See—*
Ehrlich, Don E., 3,647,129.
Lubowitz, Hyman R.; Kendrick, William P.; Jones, John F.; Thorpe, Richard S.; and Burns, Eugene A., 3,647,529.

Tseng, Samuel C.-C.: *See—*
Lean, Eric G.; Sadagopan, Varadachari; and Tseng, Samuel C.-C.,3,648,081.

Tsuboi, Yukio; Ueda, Yoshio; Ota, Tazuo; and Yoneoka, Mikio, to Japan Gas-Chemical Company, Inc. Process for purifying xylylenediamine by alkaline agent addition and distillation. 3,647,054, Cl. 203-29.

Tsuda, Minoru, to Industrial Science and Technology, Agency of. Photosensitive compositions containing furylacrylyl-containing polymer. 3,647,470, Cl. 96-115.
Tsukada, Naoshi: *See—*
Yokotsuka, Tamotsu; Aonuma, Tatsuo; Mogi, Koya; Fukushima, Danji; Yasuda, Atsushi; Watanabe, Hiroharu; Tsukada, Naoshi; and Arai, Akira,3,647,484.
Tsukamoto, Goro: *See—*
Watanabe, Toshio; Tsukamoto, Goro; Hayashi, Kimiaki; Sato, Masanori; and Iwasawa, Yoshio,3,647,799.
Tsukamoto, Shuji: *See—*
Shimazaki, Hideo; Tsukamoto, Shuji; Saito, Tadaomi; Eguchi, Sadanari; and Komata, Yasushi,3,647,825.
Tu, George K.: *See—*
Bryant, Richard W.; and Tu, George K.,3,648,079.
Tucker, William M.; Gardner, Barrie; and Hayford, John W., to Eastman Kodak Company. Method and apparatus for electroplating cylindrical objects. 3,647,646, Cl. 204-25.
Tulin, Marshall P., to Hydronautics, Incorporated. Hydrodynamic forming. 3,647,521, Cl. 217-95.
Turner, William D. Electrical musical instrument with ensemble and chief effects and unequal stereophonic outputs. 3,647,928, Cl. 84-1.24
Tygielski, Ralph E.: *See—*
Frey, Alexander H., Jr.; Schlosburg, Burton E.; and Tygielski, Ralph E.,3,648,237.
Tyson, Graham Roland: *See—*
Medding, Reuben; and Tyson, Graham Roland,3,647,123.
Uchida, Moriya: *See—*
Hara, Shigeyoshi; Senoo, Masao; Yoshida, Tsunemasa; and Uchida, Moriya,3,647,762.
Udylite Corporation: *See—*
Galloway, James H., 3,648,078.
Ueda, Yoshio: *See—*
Tsuboi, Yukio; Ueda, Yoshio; Ota, Tazuo; and Yoneoka, Mikio,3,647,054.
Uekusa, Genzo: *See—*
Yamamoto, Mititake; Uekusa, Genzo; Tanimura, Shigeru; and Maejima, Norio,3,648,117.
Ueyama, Tamotsu: *See—*
Maeda, Yo; Suzuki, Satoshi; Nakamura, Yoshiharu; Masubuchi, Yorimitu; Ueyama, Tamotsu; Fukutomi, Naoki; and Takahashi, Hiroshi,3,646,670.
Ugi, Ivar V.: *See—*
Marquarding, Dieter; Ugi, Ivar V.; Kleimann, Helmut; and Hoffmann, Peter,3,647,775.
Ugine Kuhlmann: *See—*
Isard, Arsene; and Weiss, Francis, 3,647,823.
Lakodey, Andre; and Weiss, Francis, 3,647,897.
Uhde, Friedrich, GmbH: *See—*
Mose, Luciano; and Heuser, Gerhard, 3,647,670.
Ulimann, Gunter: *See—*
Vogel, Erich; Ulimann, Gunter; and Pfluger, Gerhard,3,646,820.
Ulmer, William W., to Anaconda Wire and Cable Company. Fluid powder coating composition. 3,647,726, Cl. 260-18.
Umemura, Yukio, to Asahi Kogaku Kogyo Kabushiki Kaisha. Camera provided with automatic exposure and battery checking circuits. 3,646,859, Cl. 95-10.
Ungnadner, Friedrich, to Siemens Aktiengesellschaft. Apparatus and method for synchronizing digital distance pulse counters. 3,648,029, Cl. 235-92.
Union Carbide Corporation: *See—*
Bolton, Anthony Peter, 3,647,717.
Cole, Louis F., 3,647,702.
Foster, George N., 3,647,738.
Lytle, Thomas James, 3,647,570.
Notaro, Frank, 3,647,606.
Rabo, Jule Anton; Angell, Charles Leslie; and Skeels, Gary William, Jr., 3,647,682.
Stevens, John J., Jr., 3,647,742.
Union Tank Car Company: *See—*
Brown, Fred; and Obermeyer, James Henry, 3,647,251.
United Aircraft Corporation: *See—*
Colman, Michael E.; and Stearns, Charles F., 3,646,753.
Joslin, Frederick R., 3,647,674.
Melikian, Gorken; and Biancardi, Frank R., 3,648,194.
Winfree, Jules P., 3,647,647.
United Kingdom Atomic Energy Authority: *See—*
Bowen, Dennis Herbert; Mattingley, Neville John; and Sambell, Ronald Alfred James, 3,646,908.
United Kingdom of Great Britain and Northern Ireland, Minister of Technology in Her Britannic Majesty's Government of the:*See—*
Benjamin, John; and Jones, John Michael, 3,648,284.
Haines, Derrick John, 3,647,268.
Lawson, Graham John, 3,648,034.
United States of America
Agriculture: *See—*
Roberts, Earl J.; Rowland, Stanley P.; and Brannan, Mary Ann F., 3,647,352.
Rusca, Ralph A., 3,646,744.
Air Force: *See—*
Birnbaum, Milton; and Fincher, Curtis L., 3,648,192.
Lind, James N., 3,648,287.
Mazdiyasni, Khodabakhsh S.; Dolloff, Richard T.; and Smith, Jonathan S., II, 3,647,364.
Stansell, Marion J.; and Stansell, Shelby J., 3,648,159.
Army: *See—*
Beeker, Charles W.; and Crabtree, Royale R., 3,647,170.
Little, Little J.; and Hunter, Joe S., 3,646,818.
Atomic Energy Commission: *See—*
Kuznietz, Moshe; Lander, Gerard H.; and Baskin, Yehuda, 3,646,813.
Nelson, Paul A., 3,647,421.
Salyer, Ival O.; and Jefferson, Robert T., 3,647,721.
National Aeronautics and Space Administration, Administrator, with respect to an invention of:
Elliott, David G., and Hays, Lance G. Two-phase flow system with discrete impinging two-phase jets. 3,648,083, Cl. 310-11.
Shimada, Katsunori. Thermal to electrical power conversion system with solid state switches with seebeck effect compensation. 3,648,152, Cl. 322-2.
Zygielbaum, Arthur I., Layland, James W., and Martin, Warren L. Communications link for computers. 3,648,256, Cl. 340-172.5
Zygielbaum, Arthur I., Martin, Warren L., and Engel, Alexander. Digital video display system using cathode-ray tube. 3,648,250, Cl. 340-172.5
National Aeronautics and Space Administration: *See—*
Bower, Kenneth F., 3,648,275.
Caron, Paul R., 3,648,043.
Conger, Channing C., 3,648,209.
Howell, William E.; and Ostroff, Aaron J., 3,647,276.
Rasquin, John R., 3,647,924.
Navy: *See—*
Beatrice, Finton J., 3,648,041.
Beck, Earl J., Jr., 3,646,694.
Christoph, Walter P.; McQuitty, Jim B.; and Vendetti, Lewis A., 3,646,814.
Davis, Edward J., 3,646,889.
Drew, Gene R., 3,646,847.
Elliott, Henry H., 3,648,173.
Fitzpatrick, Hugh M.; Neville, James J.; Thompson, John; and Boggs, Fitzhugh W., 3,648,226.
Hicks, Robert E., 3,647,533.
Smith, Harold R., 3,647,164.
Soulant, Herman A., Jr., 3,648,161.
Soules, Jack A., 3,647,298.
United States Steel Corporation: *See—*
Kelso, John W., 3,647,669.
Palumbo, Pete, 3,647,053.
United States Tobacco Company: *See—*
Boyd, Eugene J., 3,646,743.
Universal Instruments Corporation: *See—*
Ragard, Phillip A., 3,646,659.
Universal Maschinenfabrik Dr. Rudolf Schieber KG: *See—*
Krause, Erich, 3,646,783.
Universal Oil Products Company: *See—*
Bajek, Walter A.; and McLaughlin, James H., 3,647,634.
Bajek, Walter A.; and McLaughlin, James H., 3,647,635.
Cyba, Henryk A., 3,647,609.
Greenwood, Arthur R.; and Vesely, Kenneth D., 3,647,680.
Hayes, John C., 3,647,719.
Rosenwald, Robert H., 3,647,637.
Vesely, Kenneth D.; and Gass, Harold D., Jr., 3,647,911.
University of Minnesota, Regents of the: *See—*
Kreevoy, Maurice M.; Borch, Richard F.; and Hutchins, Jonathan E. C., 3,647,890.
University of Minnesota, The Regents of the: *See—*
Timm, Gerald W.; and Bradley, William E., 3,646,940.
Unruh, Cornelius C.: *See—*
Borden, Douglas G.; Unruh, Cornelius C.; and Merrill, Stewart H.,3,647,444.
Upjohn Company, The: *See—*
Keeslar, Clifford R., 3,647,105.
Rynbrandt, Ronald H.; and Skaletzky, Louis L., 3,647,804.
Upman, Karl Kristapovich: *See—*
Berzin, Gunard Valdemarovich; Kalnin, Arvid Yanovich; Sushkov, Alexandr Fedorovich; Skrupsky, Voldemar Petrovich; Ziemelis, Andris Eduardovich; Soloviev, Boris Fedorovich; Leeniex, Karl Mikhailovich; Sovetin, Vladimir Kirilovich; Gulbis, Yan Karlovich; Dalbinsh, Yan Yanovich; Priede, Bruno Andreevich; Upman, Karl Kristapovich; Muzhits, Vitold Iosifovich; Junga, Yan Petrovich; Krogzem, Ivar Arnoldovich; Greitan, Zigurd Boleslavovich; and Rotsen, Karl Arturovich,3,646,687.
Upmeier, Hartmut, to Windmoller & Holscher. Blowhead for making tubular plastics film. 3,647,339, Cl. 425-326.
U.S. Philips Corporation: *See—*
Acket, Gerard Adriaan; and Vlaardingerbroek, Marinus Teunis, 3,648,185.
Bach, Horst Werner, 3,648,023.
Bonnerot, Jacques; and Paradan, Henri, 3,646,775.
De Lang, Hendrik, 3,648,055.
DeRouw, Hubertus Johannes, 3,647,583.
Kalis, Horst, 3,648,138.
Neinhuis, Rijkent Jan, 3,648,129.
Otten, Walter; Postma, Gosse Jan; Rietveld, Jan Joost; and Wolber, Jorg, 3,648,099.
Schalkwijk, Jan, 3,648,202.
Schroder, Jurgen; Wichmann, Onno; and Zuchner, Werner, 3,648,024.

Schroder, Jurgen; and Nussbaum, Hans Georg, 3,648,272.
Van Overbeek, Adrianus Johannes Wilhelmus Marie; and Krul, Leendert Gerardus, 3,647,957.
Van Westering, Peter Jan, 3,647,297.
Wanmaker, Wille Lambertus; Vrugt, Johannes Wilhelmus Ter; and De Bres, Johannes Guilielmus Cornelis Maria, 3,647,708.
Westendorp, Frans Frederik; and Zijlstra, Hinne, 3,647,574.

USM Corporation: *See—*
Zemlin, John C., 3,647,616.

Usry, Joe D., to LTV Electrosystems, Inc. Cavitating throttling valve. 3,647,176, Cl. 251-122.

Ustav pro vyzkum motorovych vozidel: *See—*
Mackerle, Julius, 3,647,012.

Usuda, Hirotaka: *See—*
Kondo, Eiroku; Usuda, Hirotaka; Suzuki, Hidemasa; and Furuya, Tuneo,3,647,981.

Vadic Corporation, The: *See—*
Saunders, Teddy G., 3,648,187.

Valeron Corporation, The: *See—*
Milewski, Victor, 3,646,650.

Van Daalen, Francois, to Shell Oil Company. Method and apparatus for stabilizing an offshore drilling platform structure. 3,646,770, Cl. 61-46.5

Van Der Linde, Aart: *See—*
Piepers, Gijsbrecht G.; Vons, Leonard H.; Van Der Linde, Aart; and Lijbrink, Eduard,3,646,994.

Van Der Molen, Leonard Hendrik, to P. J. Endenburg's Zeilmakerij en Scheepstuigerij N.V. Container lashing. 3,647,172, Cl. 248-361.

van der Puije, Patrick David, to Northern Electric Company Limited. Telephone anti-sidetone circuit. 3,647,982, Cl. 179-81.

Vanderhurst, William L.; and Kemp, Sidney D. Apparatus for tensioning tendons. 3,647,184, Cl. 254-29.

Van Dorn Company: *See—*
Thompson, Robert H., 3,647,309.

Van Eeck, Philippe F. Solid state devices for performing switching functions and including such devices having bistable characteristics. 3,648,119, Cl. 317-232.

Van Helden, Robert: *See—*
Medema, Dirk; Brunmayer-Schilt, Willy; and Van Helden, Robert,3,647,908.

van Lieshoud, Leonardus J. M., to N. V. Bataafsche Rubber Industrie 'Radium'. Wheel comprising a type of rubber or synthetic material and a method for manufacturing said wheel. 3,646,983, Cl. 152-323.

Van Overbeek, Adrianus Johannes Wilhelmus Marie; and Krul, Leendert Gerardus, to U.S. Philips Corporation. Transmission system for the transmission of characters. 3,647,957, Cl. 178-6.8

van Riper, Richard W., Jr., to Ingress-Plastene, Inc. Apparatus to facilitate the mounting, supporting and assembling of a crib type bed. 3,646,622, Cl. 5-100.

Van Uitert, Le Grand G.: *See—*
Gyorgy, Ernst M.; Sherwood, Richard C.; and Van Uitert, Le Grand G.,3,648,260.

Van Westering, Peter Jan, to U.S. Philips Corporation. Switching device for feeding the light source of a photographic enlarger. 3,647,297, Cl. 355-68.

Varner, Lawrence C., Jr.: *See—*
Enlow, Dale S.; and Varner, Lawrence C., Jr.,3,647,608.

Vartanian, Richard D., to Ford Motor Company. Carburetor fuel pump pressure actuated spark timing control system. 3,646,920, Cl. 123-117.

Vater, Wulf: *See—*
Bossert, Friedrich; and Vater, Wulf,3,647,807.

Vaughan Mfg. Co.: *See—*
Bump, Edward L., 3,647,159.

VCA Corporation: *See—*
Steiman, Wolf, 3,647,120.

Vearil, Wayne L.; and Dever, Lewis A., to Cincinnati Milacron Inc. Tool exchanger for a plurality of spindles of a machine tool. 3,646,664, Cl. 29-568.

Veb Polygraph Leipzig,-Kombinat fuer Polygraphiche Maschinen und Ausrustugen: *See—*
Schone, Helmut; Weisbach, Gunter; Johne, Hans; Kuhn, Fritz; and Lein, Werner, 3,647,205.

Venderbilt, R. T., Company, Inc.: *See—*
Robinson, Robert E.; and De Hoff, Ronald L., 3,647,701.

Vendetti, Lewis A.: *See—*
Christoph, Walter P.; McQuitty, Jim B.; and Vendetti, Lewis A.,3,646,814.

Venerable, James T.; Miyashiro, James; and Seiling, Alfred W., to Morton International, Inc. Production of alkyl thiocyanates. 3,647,849, Cl. 260-454.

Verdone, Joseph A.: *See—*
Smith, Donald A.; and Verdone, Joseph A.,3,647,464.

Vereinigte Flugtechnische Werke GmbH fruher 'Weser' Flugzeugbau/Focke-Wulf/Heinkel-Flugzeugbau: *See—*
Riedl, Franz, 3,647,166.

Vereinigte Osterreichische Eisen-und Stahlwerke Aktiengesellschaft: *See—*
Hinterholzl, Ernst, 3,646,795.
Truppe, Meinhard; Schernthaner, Matthias; and Poferl, Gunter, 3,647,560.

Vereinigte Osterreischische Eisen-und Stahlwerke Aktiengesellschaft: *See—*
Truppe, Meinhard; Schernthaner, Matthias; and Poferl, Gunter, 3,647,559.

Verenigde Kunstmestfabrieken Mekog-Albatros N.V.: *See—*
Thoonen, Theodorus J., 3,647,366.

Vertesy, Csaba: *See—*
Harsanyi, Kalman; Reiter, Jozsef; Korbonits, Dezso; Gonczi, Csaba; Takacs, Kalman; Bako, Erzsebet; Leszkovszky, Gyorgy; Tardos, Laszlo; and Vertesy, Csaba,3,647,809.

Vesely, Kenneth D.; and Gass, Harold D., Jr., to Universal Oil Products Company. Dehydrogenation of saturated hydrocarbons. 3,647,911, Cl. 260-683.3

Vesely, Kenneth D.: *See—*
Greenwood, Arthur R.; and Vesely, Kenneth D.,3,647,680.

Vetco Offshore Industries, Inc.: *See—*
Hanes, James W. E.; and Larralde, Edward, 3,647,245.

Vi-Vox, Incorporated: *See—*
Esemplare, Pascal E.; and West, Charles P., 3,647,603.

Viatron Computer Systems Corporation: *See—*
Limbert, Raymond Walter, 3,648,036.

Vickery, Ronald C.: *See—*
Brigham, Kristin; and Vickery, Ronald C.,3,647,488.

Vidal Sario, Javier. Process for the manufacture of box type tubular structural members having selectively different cross-sectional dimensions. 3,646,663, Cl. 29-463.

Vince, Michael A.: *See—*
Cade, Ronald L.; and Vince, Michael A.,3,646,910.

Vineyard, Billy D., to Monsanto Company. Mono- and bis-nitrogen-containing compounds. 3,647,691, Cl. 252-51.5

Virginia Chemicals, Inc.: *See—*
Kise, Mearl A.; and Ellis, Leonard C., 3,647,876.
Nixon, Dalbro R. Jr.; McIlhenny, David J.; and Harrell, Marvin L., 3,647,116.

Vischulis, George; and Sedlak, Charles K., to Zerand Corporation. Universal web splicer. 3,647,600, Cl. 156-504.

Vissers, H., N.V.: *See—*
Konig, Karl-Heinz; and Huntrup, Antonius, 3,646,732.

Vitkovec, Zdenek: *See—*
Kadera, Vaclav; Novotny, Josef; Vondruska, Miloslav; Feierfeil, Jiri; Svoboda, Vlastimil; Misarek, Dusan; Futera, Miroslav; Nacovska, Katerina; Janc, Zbynek; Nemec, Adolf; Penkava, Jiri; and Vitkovec, Zdenek,3,647,312.

Vittore, Lorenzo: *See—*
Guzzi, Alberto; Magagnoli, Remo; and Vittore, Lorenzo,3,647,468.

Vlaardingerbroek, Marinus Teunis: *See—*
Acket, Gerard Adriaan; and Vlaardingerbroek, Marinus Teunis,3,648,185.

Vogel, Erich; Ulimann, Gunter; and Pfluger, Gerhard, to Bosch, Robert, GmbH. Worm drive for starter motors for internal combustion engines. 3,646,820, Cl. 74-6.

Vogel, Karl E., to Improved Machinery Inc. Screening apparatus having rejects controlling means. 3,647,067, Cl. 209-242.

Vogl, Norbert G., Jr.: *See—*
Beausoleil, William F.; Ordemann, Fred A., Jr.; Pricer, Wilbur D.; and Vogl, Norbert G., Jr.,3,648,255.

Voin, Robert. Dynamo-electric machine. 3,648,090, Cl. 310-191.

Voith, J. M., GmbH: *See—*
Schiel, Christian, 3,647,621.

Vondruska, Miloslav: *See—*
Kadera, Vaclav; Novotny, Josef; Vondruska, Miloslav; Feierfeil, Jiri; Svoboda, Vlastimil; Misarek, Dusan; Futera, Miroslav; Nacovska, Katerina; Janc, Zbynek; Nemec, Adolf; Penkava, Jiri; and Vitkovec, Zdenek,3,647,312.

von Konig, Anita; and Timmler, Helmut, to Agfa-Gevaert Aktiengesellschaft. Antibronzing agents for photographic silver images. 3,647,451, Cl. 96-52.

von Meyer, William C.: *See—*
Bayer, Horst O.; Cook, Richard S.; and von Meyer, William C.,3,647,810.

von Orelli, Marcus: *See—*
Rohr, Otto; and von Orelli, Marcus,3,647,888.

Vons, Leonard H.: *See—*
Piepers, Gijsbrecht G.; Vons, Leonard H.; Van Der Linde, Aart; and Lijbrink, Eduard,3,646,994.

Von Sybel, Reinhard; Englesmann, Dieter; and Fauth, Gunter, to Agfa-Gevaert Aktiengesellschaft. Photographic apparatus with double exposure preventing means. 3,646,862, Cl. 95-31.

Voss, Raymond G.; and Ramsay, Ray D., to Phillips Petroleum Company. Apparatus for forming a non-woven web. 3,647,597, Cl. 156-377.

Vozenilek, Theodore M., 40% to Reynolds, Spencer E. Rotary switch with improved spiral contact structure. 3,647,994, Cl. 200-4.

Vrugt, Johannes Wilhelmus Ter: *See—*
Wanmaker, Wille Lambertus; Vrugt, Johannes Wilhelmus Ter; and De Bres, Johannes Guilielmus Cornelis Maria,3,647,708.

Vyskumny ustav zvaracsky: *See—*
Majek, Vladimir; Krajmer, Anton; and Smitmajer, Zdenek, 3,648,140.

Wache, Xavier. Processes for the production of iron-nickel alloys having a high nickel content. 3,647,426, Cl. 75-129.

Wachsmuth, Erich A. Automatic compressor drain system. 3,646,727, Cl. 55-21.

Wacker-Chemie G.m.b.H.: *See—*
Eck, Herbert; Schwarzbauer, Hans; and Spes, Hellmuth, 3,647,871.
Fruhwirth, Otto; and Schmidhammer, Ludwig, 3,647,895.

Nitzsche, Siegfried; Kaiser, Wolfgang; Wohlfarth, Ernst; and Hittmair, Paul, 3,647,725.

Wagner, Kuno; and Mennicken, Gerhard, to Farbenfabriken Bayer Aktiengesellschaft. Biuret diisocyanates. 3,647,848, Cl. 260-453.

Wagner, Werner: *See—*
Oppermann, Willi; Schonitz, Egon; and Wagner, Werner,3,648,007.

Waidelich, Jack P., to Rohr Corporation. Vapor cycle propulsion system. 3,646,760, Cl. 60-204.

Waidtlow, Robert M.: *See—*
Beaudry, Harvey James; and Waidtlow, Robert M.,3,648,059.

Wainer, Eugene, to Horizons Incorporated. Recovery of silver, polyester and aminoacids from processed film. 3,647,422, Cl. 75-101.

Walczak, Donald A.: *See—*
Ernick, Frederick G.; New, Thorndike C. T.; and Walczak, Donald A.,3,648,123.

Wald Manufacturing Company, Incorporated: *See—*
Pawsat, Carlton P.; and Humlong, Robert F., 3,647,242.

Waldenburger, Hermann; and Decker, Herbert, to Triumph Werke Nuermberg A.G. Single printing element positioning mechanism. 3,647,040, Cl. 197-16.

Walker, Charles S.: *See—*
Hart, Dwight L.; Jaggers, Henry T.; and Walker, Charles S.,3,648,035.

Walker, David G.; and Keyworth, Donald A., to Tenneco Chemicals, Inc. Acetylene-cuprous aluminum tetrachloride complex and a process for its production. 3,647,843, Cl. 260-438.1

Walker, John F., to Hercules Incorporated. Resinous reaction product of ethylene glycol and DMT esterified oxidate residue. 3,647,759, Cl. 260-75.

Walker, John L., Sr.: *See—*
Patterson, Robert E.; and Walker, John L., Sr.,3,646,930.

Walker, Johnnie Medical Electronics, Inc.: *See—*
Patterson, Robert E.; and Walker, John L., Sr., 3,646,930.

Wallace, Robert F.: *See—*
Christiansen, Paul J.; and Wallace, Robert F.,3,648,118.

Walters, James C. Bale stacking apparatus. 3,647,091, Cl. 214-6.

Walters, William T., to AMF Incorporated. Ultrasonic flaw detection circuit. 3,646,805, Cl. 73-67.9

Wanlass, Cravens L. Core constructions for variable inductors and parametric devices. 3,648,206, Cl. 336-160.

Wanmaker, Wille Lambertus; Vrugt, Johannes Wilhelmus Ter; and De Bres, Johannes Guiljelmus Cornelis Maria, to U.S. Philips Corporation. Luminescent material. 3,647,708, Cl. 252-301.6

Ward, John H., to Optronics International. Identification system using reference beam coded halograms. 3,647,275, Cl. 350-3.5

Warner & Swasey Company, The: *See—*
Schuman, Ralph H., 3,648,276.

Warner, Dale J.: *See—*
Lojkutz, Bruno V.; Warner, Dale J.; and Schulz, George H.,3,647,227.

Watanabe, Hiroharu: *See—*
Yokotsuka, Tamotsu; Aonuma, Tatsuo; Mogi, Koya; Fukushima, Danji; Yasuda, Atsushi; Watanabe, Hiroharu; Tsukada, Naoshi; and Arai, Akira,3,647,484.

Watanabe, Jun; Hosoi, Susumu; Kuwazaki, Masahiro; Ota, Akira; Takata, Toshikatsu; and Asaoka, Junichi, to Matsushita Electric Industrial Co., Ltd. Dry cells. 3,647,552, Cl. 136-131.

Watanabe, Osamu: *See—*
Yamaguchi, Yoshio; and Watanabe, Osamu,3,646,806.

Watanabe, Toshio; Tsukamoto, Goro; Hayashi, Kimiaki; Sato, Masanori; and Iwasawa, Yoshio, to Tanabe Seiyaku Co., Ltd. 6,7-Diacyloxy-tetrahydroisoquinoline compounds. 3,647,799, Cl. 260-286.

Watanabe, Yoshimi, to Sony Corporation. Magnetic recording and/or reproducing device with tape engagement means which moves in a concentric path with the head. 3,647,984, Cl. 179-100.2

Watarai, Syu: *See—*
Ono, Hisatake; Watarai, Syu; and Katsuyama, Harumi,3,647,428.

Watch-Tel 24, Inc.: *See—*
Cushman, Edward J.; and Clark, Jasper, 3,647,971.

Watson, Donald W.: *See—*
McGuire, John V.; and Watson, Donald W.,3,647,602.

Watson, Earnest B., 50% to Bowers, Raymond S., Jr. Counterbalancing system for oil field pump jacks. 3,646,833, Cl. 74-589.

Watson, James Power, to RCA Corporation. Multi-electrode transducer element. 3,648,279, Cl. 340-365.

Watson, Robert H.: *See—*
Sams, Gerald R.; and Watson, Robert H.,3,648,073.

Watts, Leonard. Moisture proofing process. 3,646,720, Cl. 52-744.

Watts, Wilson J., to Ford Motor Company. Releasable strap encircling member. 3,646,644, Cl. 24-114.5

Wayne, Theodore J.: *See—*
Budris, Allan R.; McGowan, Frank J.; Evans, Lewis M.; Wayne, Theodore J.; Lithen, Eric E.; and Darcy, Charles B.,3,646,901.

Webb, Frederick J.; and Tate, David P., to Firestone Tire & Rubber Company, The. . 3,647,774, Cl. 260-94.2

Weber, Abraham; Frossard, Jacques Jean; and Bouzard, Daniel, to Mead Johnson & Company. Aminopropionanilides. 3,647,877, Cl. 260-562.

Weber, Bob L., to Holotron Corporation. Apparatus and method for hologram copying with reference beam intensity control. 3,647,289, Cl. 355-2.

Weber, Sheldon Alan, to Ampex Corporation. Magnetic recording tape and method for preparing the same. 3,647,539, Cl. 117-235.

Weckler, Gene P., to Fairchild Camera and Instrument Corporation. Photosensor circuit with integrated current drive. 3,648,051, Cl. 250-211.

Wegener, Hans F., to National Steel Corporation. Apparatus for stacking units of sheet material. 3,647,045, Cl. 198-41.

Wehner, Albert. Screen carrying members for deforming web screens. 3,647,068, Cl. 209-310.

Weikel, Donald J., Jr., to Xerox Corporation. Transfer apparatus. 3,647,292, Cl. 355-3.

Weiner, Martin Eric, to Bell Telephone Laboratories, Incorporated. Method of Group III-V semiconductor crystal growth using getter dried boric oxide encapsulant. 3,647,389, Cl. 23-204.

Weinerth, Hans, to International Standard Electric Corporation. Method for the manufacture of a solid state circuit adaptable as H.F. tuner. 3,647,580, Cl. 148-175.

Weintraub, Marvin H.: *See—*
Rich, James L.; and Weintraub, Marvin H.,3,647,744.

Weisbach, Gunter: *See—*
Schone, Helmut; Weisbach, Gunter; Johne, Hans; Kuhn, Fritz; and Lein, Werner,3,647,205.

Weiss, Francis: *See—*
Isard, Arsene; and Weiss, Francis,3,647,823.
Lakodey, Andre; and Weiss, Francis,3,647,897.

Weisz, Herman S.: *See—*
Hardwicke, James E.; Scheffler, Bernard; and Weisz, Herman S.,3,647,734.

Wellman Industries, Inc.: *See—*
Johns, Herman S., 3,646,640.

Wells, John B., to Xerox Corporation. Photoelectrophoretic imaging method employing a halogen containing suspension. 3,647,660, Cl. 204-181.

Wenzel, Werner; and Schenck, Hermann, to Rheinische Braunkohlewerke A.G. Method of gasifying water-containing coal. 3,647,379, Cl. 48-202.

Werner & Pfleiderer: *See—*
Kuchenthal, Gunther; and Hentzschel, Wolfgang, 3,646,689.

Werner, Bernfried M., to Phelan, Louis A. M. Pressure sensitive switch assembly. 3,646,774, Cl. 62-188.

Wescom, Inc.: *See—*
Foulkes, John D.; and Bender, Warren G., 3,647,993.

West, Charles P.: *See—*
Esemplare, Pascal E.; and West, Charles P.,3,647,603.

West, Hiry B.: *See—*
Kober, Frederick P.; and West, Hiry B.,3,647,550.

West Point-Pepperell, Inc.: *See—*
Morris, Thomas S., 3,647,591.

Westendorp, Frans Frederik; and Zijlstra, Hinne, to U.S. Philips Corporation. Method of reducing the coercive force of permanent- magnetisible material. 3,647,574, Cl. 148-103.

Western Electric Company, Incorporated: *See—*
Blitchington, Frank H., Jr.; and Harris, Richard A., 3,647,961.
Rott, Dennis A.; and Smiljanic, John P., 3,647,730.

Westinghouse Electric Corporation: *See—*
Andrews, Harry N.; Patterson, John F.; and Wilson, John F., 3,647,622.
Aue, John R., 3,647,075.
Booker, Clyde A., Jr.; and Thompson, Francis T., 3,647,953.
Booker, Clyde A., Jr.; and Thompson, Francis T., 3,647,954.
Buck, Daniel C.; and Schellenberg, James M., 3,648,199.
Davies, Norman; and Binz, Robert D., 3,648,204.
Dax, Peter R.; and Moore, Thomas M., 3,648,284.
De Caro, Aristide R.; and Rainone, Nicholas J., 3,648,094.
Engel, Joseph C.; and Elms, Robert T., 3,648,106.
Goldie, Harry; Goldman, Michael A.; and Klein, Gerald, 3,648,100.
Grimmer, Elmer J., 3,647,938.
Heller, Paul R.; Brenner, William C.; and Philosaky, Harold M., 3,647,932.
Hepps, Michael B. L.; and Ferrari, Harry M., 3,647,623.
Holtkamp, Calvin J., 3,648,011.
Holtkamp, Calvin J., 3,648,012.
Kernick, Andress; Geyer, Manvel A.; and Ernsberger, Glenn W., 3,648,150.
Mc Keithan, Wesley L., 3,648,211.
McGinnis, Gerald E., 3,647,392.
Munson, William A., 3,647,198.
Redecker, Henry W.; and Zisa, William J., 3,648,166.
Wooldridge, James E.; and Yamasaki, George K., 3,648,092.
Wootton, Horace; and Mierley, George M., Sr., 3,647,311.

Westvaco Corporation: *See—*
Koches, Charles F., 3,647,716.

Wetch, Joseph R.; Sudar, Seymour; and Bienvenue, Louis L., to North American Rockwell Corporation. Muffler device for removing impurities. 3,647,394, Cl. 23-288.

Wetzel, Rolf Emil; and Janssen, Willi, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Process for producing sponge iron. 3,647,417, Cl. 75-35.

Wezel, Hans Georg, to Schmid & Wezel, Firma. Motor-driven cutting device. 3,646,675, Cl. 30-217.

Whetstone, Albert L., to Science Accessories Corporation. Keyboard encoding. 3,647,962, Cl. 178-17.

Whetstone, Albert L.; and Fine, Samuel, to Science Accessories Corporation. Magnetic graphical data device. 3,648,277, Cl. 340-347.

Whirlpool Corporation: *See—*
Keiser, John E.; and Krieger, Earl, 3,647,509.

Whistler, Wayne J.: *See—*
Bushman, Bliss M.; and Whistler, Wayne J.,3,648,047.

Whitaker, Michael E., to Gullick Dobson Limited, Inc. Mine roof supports. 3,646,768, Cl. 61-45.

White, Alvin S., to Singer-General Precision, Inc. Flight path display instrument. 3,648,232, Cl. 340-27.

White, Frederick K., to Gulf Research & Development Company. Catalyst regeneration with transfer line combustion and disperse phase discharge into a regenerator. 3,647,714, Cl. 252-417.

White, John M., to Sperry Rand Corporation. Method for metalizing beryllium oxide at low temperatures. 3,647;519, Cl. 117-71.

Whitla, James, to Lockheed Aircraft Corporation. Aircraft compartment and magnetic connecting assembly. 3,647,165, Cl. 244-118.

Wiandt, Ronald K.: *See—*
Kelly, Jack L.; and Wiandt, Ronald K.,3,647,222.

Wichmann, Onno: *See—*
Schroder, Jurgen; Wichmann, Onno; and Zuchner, Werner,3,648,024.

Wick, Gerald H.; and Holtermann, Theodore J., to Outboard Marine Corporation. Upper driveshaft bearing lubrication for marine propulsion unit. 3,647,024, Cl. 184-6.18

Wieger, George F., to Bendix Corporation, The. Floating output wedge with articulated pull rod. 3,647,034, Cl. 188-343.

Wiese, Delmar R., to Hoover Ball and Bearing Company. Bin with improved door seal and content release characteristics. 3,647,106, Cl. 220-31.

Wiese, John R.: *See—*
Hance, Richard J.; Wiese, John R.; and Clauss, Harry G., Jr.,3,646,816.

Wiese, Joseph A., Jr.; and Barte, William B., to Minnesota Mining and Manufacturing Company. Sheet-like material, the method of storing an image consisting of differing magnetic, electrical, and optical properties. 3,648,257, Cl. 340-173.

Wiesler, Mordechai, to Teledyne, Inc. Probe and head assembly. 3,648,169, Cl. 324-158.

Wieslogle, Frederick Y.; and Bernstein, Jack, to Squibb, E. R., & Sons, Inc. Imines of nitroheterocyclic aldehydes and compounds of the penicillanic acid or cepham series. 3,647,781, Cl. 260-239.1

Wiggins, Walter J. Recording system for job accounting information. 3,648,243, Cl. 340-152.

Wiig, Chester M., to Littell, F. J., Machine Company. Feeding apparatus for strip material. 3,647,127, Cl. 226-155.

Wiktor, Dominik M., to Automatic Switch Company. Electrical switch having contacts provided with rollers. 3,648,003, Cl. 200-166.

Wildeman, Arno Edgar, to Cosmopolitan Textile Company Limited. Apparatus and method for making a stitch bonded fabric. 3,646,780, Cl. 66-85.

Wiljanen, Bo Ingvar: *See—*
Sahlgren, Rolf Ake; and Wiljanen, Bo Ingvar,3,646,826.

Wilke, Gerhard; Schnell, Gerhard; and Hoyer, Karl, to Bosch, Robert, G.m.b.H. Transporation system. 3,647,014, Cl. 180-14.

Wilkes, John B., to Chevron Research Company. Stabilization of cobalt carbonyl compounds by oxygen-dentated ligands. 3,647,842, Cl. 260-439.

Wilkes, John B. Stabilization of cobalt carbonyl compounds by azoxy-dentated ligands. 3,647,845, Cl. 260-439.

Wilkes, John B., to Chevron Research Company. Secondary alcohol sulfation process in the presence of inorganic salts. 3,647,851, Cl. 260-459.

Wilkin, Geoffrey Alan; McNab, Ian Roderick; and Appleton, Anthony Derek, to International Research & Development Company Limited. Current transfer devices for electrical machines. 3,648,088, Cl. 310-178.

Wilkins, Glenn E.: *See—*
Grafton, Jim R.; Wilkins, Glenn E.; and Murphy, Joseph F.,3,646,928.

Wilkins, John William: *See—*
McLean, Peter; and Wilkins, John William,3,647,319.

Wilkinson Sword Limited: *See—*
Fitzpatrick, James, 3,646,674.

Williams, Kenneth C., to Ethyl Corporation. Synthesis of organolead compounds. 3,647,837, Cl. 260-437.

Williams, Kenneth C.; and Thomas, Wilford H., to Ethyl Corporation. Method of making tetraorganolead compounds. 3,647,838, Cl. 260-437.

Williams, Kenneth C.: *See—*
Hudson, Russell L.; Williams, Kenneth C.; and Smith, Martin B.,3,647,777.

Williams, Leon, Jr.; and Gerbetz, William. Board game apparatus. 3,647,217, Cl. 273-134.

Williams, Meurig W., to Du Pont de Nemours, E. I., and Company. Process. 3,647,355, Cl. 8-130.1

Williams, Robert C., III, to Cutler-Hammer, Inc. Auxiliary support means for electrical switch actuator. 3,648,004, Cl. 200-166.

Willson, Philip J.: *See—*
Leising, Maurice B.; Greif, Herman J., Jr.; Kirberg, James R.; and Willson, Philip J.,3,647,393.

Wilson, Fred A.: *See—*
Moore, Glenn E.; Wilson, Fred A.; and Wood, Chester W.,3,646,974.

Wilson, John F.: *See—*
Andrews, Harry N.; Patterson, John F.; and Wilson, John F.,3,647,622.

Wilson, Richard A.: *See—*
Evers, William J.; Katz, Ira; Wilson, Richard A.; and Theimer, Ernst T.,3,647,792.

Wince, Vearl S., to Holophane Company, Inc. Veiling glare control with luminaires. 3,647,148, Cl. 240-93.

Windmoller & Holscher: *See—*
Upmeier, Hartmut, 3,647,339.

Winfree, Jules P., to United Aircraft Corporation. Process for plating titanium. 3,647,647, Cl. 204-32.

Winpisinger, Joseph L.: *See—*
Brown, Harold J.; and Winpisinger, Joseph L.,3,648,149.

Winslow, John S., to Tetra Tech, Inc. Adaptive underwater camera. 3,646,863, Cl. 95-11.

Winston, Eric: *See—*
Jacobs, Herbert V.; and Winston, Eric,3,647,202.

Wisconsin Alumni Research Foundation: *See—*
Evenson, Merle A., 3,647,624.

Wise, John J.: *See—*
Caesar, Philip D.; Haag, Werner O.; and Wise, John J.,3,647,916.

Wisely, Kenneth, 45% to Yelvington, John J. Rotary multiple contact periodic switch for internal combustion engine with improved distributor shaft contact collar. 3,647,995, Cl. 200-24.

Wismer, Marco: *See—*
Doerge, Herman P.; and Wismer, Marco,3,647,724.

Witco Chemical Company, Inc.: *See—*
Bluestein, Bernard R.; and Solomon, Jack M., 3,647,795.

Woessner, Richard; and Benda, Alexander Z., to Wood Industries, Inc., mesne. Plate cylinder with interchangeable plate clamping device. 3,646,886, Cl. 101-378.

Wohgemuth, Larry G.; and Fritock, William H., to Atlantic Richfield Company. Terpolymers of an n-vinyl urethane, an acrylate and an unsaturated nitrile carbonate. 3,647,760, Cl. 260-77.5

Wohlfarth, Ernst: *See—*
Nitzsche, Siegfried; Kaiser, Wolfgang; Wohlfarth, Ernst; and Hittmair, Paul,3,647,725.

Wolber, Jorg: *See—*
Otten, Walter; Postma, Gosse Jan; Rietveld, Jan Joost; and Wolber, Jorg,3,648,099.

Wold, Ivar, to Solartron Electronic Group Limited, The. Chain-code correlator. 3,648,040, Cl. 235-181.

Wolf, Emanuel, to Swiss Aluminium Ltd. Method of bending plates. 3,647,590, Cl. 156-211.

Wolf, Milton; and Diebold, James L., to American Home Products Corporation. 10-Substituted-1,2,3,4-tetrahydrobo-[b][1,6]naphthyridines useful as CNS depressants. 3,647,800, Cl. 260-287.

Wolf, Paul A., to Dow Chemical Company, The. Preservation of aqueous dispersions with bromocyanoacetamides. 3,647,610, Cl. 162-161.

Wolfe, Raymond, to Bell Telephone Laboratories, Incorporated. Magnetic element using isolated domains in rare earth orthoferrites. 3,647,538, Cl. 117-234.

Wolff, William F.; Rosscup, Robert J.; and Ridgway, John A., Jr., to Standard Oil Company. Retardation of coke formation. 3,647,677, Cl. 208-48.

Wollner, Johannes; Cherubim, Martin Karl; and Henn, Friedrich Gerhard, to Deutsche Texaco Aktiengesellschaft. Epoxy resin and diglycidylisoalkylamine composition. 3,647,918, Cl. 260-830.

Wollney, John L.; Jawor, Ronald W.; and Sanders, Norman L. Orthodontic force model. 3,646,680, Cl. 32-71.

Wolverine-Pentronix, Inc.: *See—*
Smith, Joseph E., 3,647,333.

Wood, Chester W.: *See—*
Moore, Glenn E.; Wilson, Fred A.; and Wood, Chester W.,3,646,974.

Wood Industries, Inc.: *See—*
Woessner, Richard; and Benda, Alexander Z., 3,646,886.

Wood, Michael Burke: *See—*
Macnab, Robert Beattie; Ross, John Sterry Hawley; and Wood, Michael Burke,3,648,082.

Wood, Samuel J., Jr.: *See—*
Cunningham, James A.; Fuller, Clyde R.; and Wood, Samuel J., Jr.,3,647,663.

Woodall Industries Inc.: *See—*
Greig, James W., 3,647,588.

Woodberry, Paul T., to Mallory, P. R., & Co., Inc. Polyester bonding process. 3,647,592, Cl. 156-285.

Woodcock, Terence Keith, to British Aircraft Corporation Limited. Pulse generators. 3,648,180, Cl. 328-959.

Woodland, Lawrence R.: *See—*
Johnson, Dennis E.; Woodland, Lawrence R.; Kensler, Charles J.; and Himmelfarb, Philip,3,647,632.

Woods, William E.: *See—*
Thron, John E.; Woods, William E.; Bellettiere, Ronald; and Stein, Howard,3,648,252.

Woodworth, Chester L.: *See—*
Skibo, Andrew D.; and Woodworth, Chester L.,3,647,344.

Wooldridge, James E.; and Yamasaki, George K., to Westinghouse Electric Corporation. Arsenic-antimony-bismuth hollow cathode lamp. 3,648,092, Cl. 313-209.

Wootton, Horace; and Mierley, George M., Sr., to Westinghouse Electric Corporation. Turbine interstage seal assembly. 3,647,311, Cl. 415-113.

Worndl, John, to Canadian Industries Limited. Method of making a valve bag. 3,646,856, Cl. 93-35.

Worthington Corporation: *See—*
Budris, Allan R.; McGowan, Frank J.; Evans, Lewis M.; Wayne, Theodore J.; Lithen, Eric E.; and Darcy, Charles B., 3,646,901.
Wowries, August Hermann. Tuning device. 3,647,930, Cl. 84-318.
Wray, Gary Q.: *See—*
Manes, Dewey K.; Farley, David L.; and Wray, Gary Q.,3,646,995.
Wurst, Helmut; and Matthis, Hans, to Hoefliger & Karg. Polishing of discrete articles. 3,646,631, Cl. 15-308.
Wycoff, Ronald Lee: *See—*
Rochelle, William R.; and Wycoff, Ronald Lee,3,646,947.
Wyler, Max: *See—*
Calzaferri, Hans; Kunz, Werner; Schwemmer, Martin W.; and Wyler, Max,3,647,353.
Wyomissing Corporation: *See—*
Trewella, Robert J., 3,647,152.
Xerox Corporation: *See—*
Cade, Ronald L.; and Vince, Michael A., 3,646,910.
Egnaczak, Raymond K.; and Squassoni, Gino F., 3,647,290.
Egnaczak, Raymond K., 3,647,294.
Keller, Carol K.; Royka, Stephen F.; and Snelling, Christopher, 3,647,659.
Leiga, Algird G., 3,648,133.
Mc Pherson, Donald F., 3,647,207.
McGuire, John V.; and Watson, Donald W., 3,647,602.
Morse, Philip, 3,647,713.
Weikel, Donald J., Jr., 3,647,292.
Wells, John B., 3,647,660.
Yabuuchi, Hiroshi: *See—*
Nakaguchi, Kohei; Kawasumi, Shohachi; Hirooka, Masaaki; Yabuuchi, Hiroshi; and Takao, Hiroyoshi,3,647,753.
Nakaguchi, Kohei; Kawasumi, Shohanchi; Hirooka, Masaaki; and Yabuuchi, Hiroshi,3,647,771.
Yamagata, Akinori: *See—*
Mukai, Hisakazu; Kindo, Hideaki; Sugahara, Yoshimasa; and Yamagata, Akinori,3,648,064.
Yamagishi, Hidehisa; Gunji, Naoki; and Takeuchi, Masao, to Nippon Kokan Kabushiki Kaisha. Method of treating tin plate or galvanized sheet. 3,647,650, Cl. 204-35.
Yamaguchi, Tsuneo: *See—*
Naito, Han-Ichiro; and Yamaguchi, Tsuneo,3,648,241.
Yamaguchi, Yoshio; and Watanabe, Osamu, to Nippon Kokan Kabushiki Kaisha. Ultrasonic prove system for flaw-detection of material. 3,646,806, Cl. 73-71.5
Yamaji, Kenkichi: *See—*
Tanaka, Eihachiro; Fukuda, Takeji; Yamaji, Kenkichi; Miyake, Yasuhiko; Ota, Hiroshi; and Kimura, Katsuo,3,646,796.
Yamamoto, Atsushi; Omori, Tairiku; and Yasui, Hiroshi, to Hyowa Hakko Kogyo Co., Ltd. Process for demethoxylation by microorganisms. 3,647,629, Cl. 196-30.
Yamamoto, Hisao: *See—*
Arasaki, Seitetsu; Yamamoto, Hisao; and Inaba, Shigeho,3,647,785.
Yamamoto, Mititake; Uekusa, Genzo; Tanimura, Shigeru; and Maejima, Norio, to Omron Tateisi Electronics Co. Magnetic device. 3,648,117, Cl. 317-156.
Yamamoto, Shinji: *See—*
Ito, Ken; Kaminaka, Hiroshi; Kotera, Norio; Yamamoto, Shinji; Dohgane, Iwao; Shigehiro, Kosuke; Kuruma, Hiroshi; Chinuki, Takashi; Yoshitake, Hiroshi; Tanimoto, Kenji; Hasegawa, Shinichi; and Kobayasi, Nobuki,3,647,866.
Yamamura, Katsumi; and Kasai, Masami, to Kabushiki Kaisha Suwa Seikosha. Method of hardening sintered cemented-carbide compositions by boronizing. 3,647,576, Cl. 148-126.
Yamane, Reiichi: *See—*
Mizutani, Yukio; Yamane, Reiichi; Sata, Toshikatsu; and Izuo, Ryuji,3,647,086.
Yamaoka, Goichi, to Kabushiki Kaisha Suwa Seikosha. Electric dry shaver with movable comb. 3,646,673, Cl. 30-43.92
Yamasaki, George K.: *See—*
Wooldridge, James E.; and Yamasaki, George K.,3,648,092.
Yamazaki, Takao: *See—*
Amakasu, Tatuo; and Yamazaki, Takao,3,648,006.
Yano, Tomosaburo; Oishi, Naoaki; Komatsu, Akitoshi; and Koyama, Keizi, to Showa Denko Kabushiki Kaisha. Tantalum powder for sintered capacitors. 3,647,415, Cl. 75-0.5
Yardney International Corporation: *See—*
Kober, Frederick P.; and West, Hiry B., 3,647,550.
Yarrington, Alfred R., to Precision Instrument Company. Error correcting encoder and decoder for asymmetric binary data channels. 3,648,238, Cl. 340-146.1
Yasuda, Atsushi: *See—*
Yokotsuka, Tamotsu; Aonuma, Tatsuo; Mogi, Koya; Fukushima, Danji; Yasuda, Atsushi; Watanabe, Hiroharu; Tsukada, Naoshi; and Arai, Akira,3,647,484.
Yasui, Hiroshi: *See—*
Yamamoto, Atsushi; Omori, Tairiku; and Yasui, Hiroshi,3,647,629.
Yelvington, John J.: *See—*
Wisely, Kenneth, 3,647,995.
Yeou, Ta, to Thomson-CSF. Delay lines for microwave tubes. 3,648,198, Cl. 333-31.
Yokota, Ryosuke; and Muto, Yuhei, to Tokyo Shibaura Electric Co., Ltd. Dosimeter using a fluorescent glass element. 3,648,049, Cl. 250-71.5
Yokotsuka, Tamotsu; Aonuma, Tatsuo; Mogi, Koya; Fukushima, Danji; Yasuda, Atsushi; Watanabe, Hiroharu; Tsukada, Naoshi; and Arai, Akira, to Kikkoman Shoyu Co., Ltd. Method of preparing soy. 3,647,484, Cl. 99-145.
Yoneoka, Mikio: *See—*
Tsuboi, Yukio; Ueda, Yoshio; Ota, Tazuo; and Yoneoka, Mikio,3,647,054.
Yoshida, Tsunemasa: *See—*
Hara, Shigeyoshi; Senoo, Masao; Yoshida, Tsunemasa; and Uchida, Moriya,3,647,762.
Yoshikawa, Sadayoshi, to New Nippon Electric Co., Ltd. Variable trap device for television receivers and the like. 3,647,950, Cl. 178-5.8
Yoshino, Masatsugu: *See—*
Nagamatsu, Kazuo; Yoshino, Masatsugu; Konno, Tsugio; and Ishida, Shinichi,3,647,743.
Yoshioka, Teruhiko: *See—*
Matsuzawa, Hideo; Itoh, Hirotoshi; and Yoshioka, Teruhiko,3,647,640.
Yoshitake, Hiroshi: *See—*
Ito, Ken; Kaminaka, Hiroshi; Kotera, Norio; Yamamoto, Shinji; Dohgane, Iwao; Shigehiro, Kosuke; Kuruma, Hiroshi; Chinuki, Takashi; Yoshitake, Hiroshi; Tanimoto, Kenji; Hasegawa, Shinichi; and Kobayasi, Nobuki,3,647,866.
Yost, Robert L., to Dues, Joseph J. Apparatus for forming a cored concrete slab. 3,647,308, Cl. 425-111.
Younkin, James R., to Mitchell Industries, Inc. Aircraft heading and course display. 3,648,230, Cl. 340-27.
Yueh, Mao Hsun, to General Mills, Inc. Reduction and modification of the unpleasant aftertaste of saccharin. 3,647,482, Cl. 99-141.
Yurasek, John F.: *See—*
Owens, Abner, Jr.; and Yurasek, John F.,3,648,231.
Zachae, Gottfried. Signalling device for a fishing line. 3,646,698, Cl. 43-17.
Zahradnik, George J.; and Pudark, Arthur A., to Dick, A. B., Company. Automatic stopping mechanism for a motion picture projector. 3,647,288, Cl. 352-174.
Zalusky, James T.: *See—*
Zipin, Richard B.; and Zalusky, James T.,3,647,302.
Zarrello, Thomas. Dye machine with fabric tension adjustment. 3,646,784, Cl. 68-20.
Zaweski, Edward F.; and Meltsner, Bernard R., to Ethyl Corporation. Antioxidant composition for organic materials. 3,647,749, Cl. 260-45.85
Zeman, Jack R. Artificial fish lure. 3,646,699, Cl. 43-35.
Zemlin, John C., to USM Corporation. Stiffener and process for stiffening flexible sheet material. 3,647,616, Cl. 161-190.
Zenith Radio Corporation: *See—*
Sobel, Alan, 3,647,958.
Zenkner, Kurt. Device for adjusting the temperature. 3,646,875, Cl. 98-2.08
Zerand Corporation: *See—*
Vischulis, George; and Sedlak, Charles K., 3,647,600.
Ziegler, Carl; and Sprague, James M., to Merck & Co., Inc. Nuclear sulfonyl substituted N-acylbenzenesulfonamides. 3,647,873, Cl. 260-556.
Ziemelis, Andris Eduardovich: *See—*
Berzin, Gunard Valdemarovich; Kalnin, Arvid Yanovich; Sushkov, Alexandr Fedorovich; Skrupsky, Voldemar Petrovich; Ziemelis, Andris Eduardovich; Soloviev, Boris Fedorovich; Leeniex, Karl Mikhailovich; Sovetin, Vladimir Kirilovich; Gulbis, Yan Karlovich; Dalbinsh, Yan Yanovich; Priede, Bruno Andreevich; Upman, Karl Kristapovich; Muzhits, Vitold Iosifovich; Junga, Yan Petrovich; Krogzem, Ivar Arnoldovich; Greitan, Zigurd Boleslavovich; and Rotsen, Karl Arturovich,3,646,687.
Zijlstra, Hinne: *See—*
Westendorp, Frans Frederik; and Zijlstra, Hinne,3,647,574.
Zilahy, Zoltan E.; and Dato, Anthony L., to Standard Tool & Manufacturing Co. Machine having overhang supports for pallets. 3,646,656, Cl. 29-200.
Zimmermann, Jos., Messrs.: *See—*
Henning, Walter, 3,647,156.
Zipf, Frederick W., III, to Blessings, Inc. Disposable draw sheet. 3,646,624, Cl. 5-334.
Zipin, Richard B.; and Zalusky, James T., to Bendix Corporaion, The. Apparatus for and method of obtaining precision dimensional measurements. 3,647,302, Cl. 356-106.
Zisa, William J.: *See—*
Redecker, Henry W.; and Zisa, William J.,3,648,166.
Zuchner, Werner: *See—*
Schroder, Jurgen; Wichmann, Onno; and Zuchner, Werner,3,648,024.
Zulkowski, Peter, W.: *See—*
Newkirk, Marc S.; and Zulkowski, Peter, W.,3,646,924.
Zurcher, Frank W., Jr.: *See—*
Mullery, Alvin P.; and Zurcher, Frank W., Jr.,3,648,253.
Zurla, Frank A., to International Business Machines Corporation. Decimal addition employing two sequential passes through a binary adder in one basic machine cycle. 3,648,246, Cl. 340-172.5
Zygielbaum, Arthur I.: *See—*
United States of America,National Aeronautics and Space Administration, Administrator, 3,648,256.
United States of America,National Aeronautics and Space Administration, Administrator, 3,648,250.

LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 7TH DAY OF MARCH, 1972

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Adams, Benjamin B.: *See*—
Stoneham, Jeffrey R., and Adams. T896,007.

Allied Chemical Corp.: *See*—
Tajb, Bernard. T896,018.

Baker, Joseph W., and I. Schumacher. Bacteriostatic aralkanols. T896,003, 3–7–72, Cl. 260—618.

Beach, David E. Lens cover and signal device. T896,020, 3–7–72, Cl. 95—11.

Dillon, Brian D.: *See*—
Huffaker, James E., and Dillon. T896,014.

Du Pont de Nemours, E. I., and Co.: *See*—
Harris, Roland G. T896,016.
Parsons, Joseph F. T896,005.
Reilly, Eugene P. T896,013.
Richard, Paul H. T896,002.
Rufino, Jose J. T896,012.
Starr, Frank C., Jr. T896,009.
Wolinski, Leon E. T896,017.

Eastman Kodak Co.: *See*—
Stevenson, George M. T896,001.

Glanvill, Alan B. Antistatic Polyolefin composition. T896,006, 3–7–72, Cl. 260—93.7.

Halasa, Adel F. Composition of matter and method. T896,004, 3–7–72, Cl. 260—79.5.

Harris, Roland G., to E. I. du Pont de Nemours and Co. Food package. T896,016, 3–7–72, Cl. 99—171.

Huffaker, James E., and B. D. Dillon. Method of making plywood cores. T896,014, 3–7–72, Cl. 161—60.

Lewis, Howard M. Prevention of fiber shedding from napped polyester blankets. T896,015, 3–7–72, Cl. 117—138.8.

Lochmaier, Wayne W. Emulsions and uses thereof. T896,010, 3–7–72, Cl. 117—136.

Nadeau, Gale F., Jr. *See*—
Zaffrann, Ralph D., and Nadeau. T896,019.

Parsons, Joseph F., to E. I. du Pont de Nemours and Co. Sandwich wire coating construction. T896,005, 3–7–72, Cl. 117—218.

Reilly, Eugene P., to E. I. du Pont de Nemours and Co. Copolymers of methyl methacrylate. T896,013, 3–7–72, Cl. 260—86.1.

Richard, Paul H., to E. I. du Pont de Nemours and Co. Frictional compositions. T896,002, 3–7–72, Cl. 117—161.

Rufino, Jose J., to E. I. du Pont de Nemours and Co. Process of modifying polycarbonamide fibers with orthophenylphenol. T896,012, 3–7–72, Cl. 8—130.1.

Schumacher, Ignatius: *See*—
Baker, Joseph W., and Schumacher. T896,003.

Starr, Frank C., Jr., to E. I. du Pont de Nemours and Co. High friction article based on a polyimide resin. T896,009, 3–7–72, Cl. 260—37.

Stevenson, George M., to Eastman Kodak Co. High purity polyester depolymerization products from polyester scrap by complete hydrogenation. T896,001, 3–7–72, Cl. 260—617.

Stoneham, Jeffrey R., and B. B. Adams. Battery holder. T896,007, 3–7–72, Cl. 136—173.

Tajb, Bernard, to Allied Chemical Corp. Scuff-resistant urethane coated fabrics. T896,018, 3–7–72, Cl. 117—76.

Valentine, David L. Esters of 4-methylcyclohexanemethanol. T896,008, 3–7–72, Cl. 260—475.

Ville, Ivan B.: *See*—
York, William C., and Ville. T896,011.

Wolinski, Leon E., to E. I. du Pont de Nemours and Co. Thermoforming laminar foam structures. T896,017, 3–7–72, Cl. 264—321.

York, William C., and I. B. Ville. Cleaning method and apparatus for removing developer from photosensitive elements. T896,011, 3–7–72, Cl. 117—37.

Zaffrann, Ralph D., and G. F. Nadeau, Jr. Lithographic reproductions. T896,019, 3–7–72, Cl. 96—33.

LIST OF DESIGN PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 7TH DAY OF MARCH, 1972

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Allen, C. Andrew, to S. A. Allen, Inc. Solenoid controlled valve. 223,095, 3–7–72, Cl. D23—19.

Allen, S. A., Inc.: *See*—
Allen, C. Andrew. 223,095.

Benrube, Jack S., assignor to Nathan Rosen and Morris Luxenberg, fractional part interest to each. Pants. 223,077, 3–7–72, Cl. D2—227.

Bergman Tool Mfg. Co., Inc.: *See*—
Freedman, Alan A. 223,081.

Brooks, Riley H. Paper towel dispenser. 223,049, 3–7–72, Cl. D52—2.

Catalano, Paul D., and G. C. Hoehne, to Retention Communications Systems, Inc. Audio visual cartridge. 223,098, 3–7–72, Cl. D26—14.

Cato, John B. Lightning insulator pad for campers, 223,093, 3–7–72, Cl. D23—10.

Coleman, Clarence B., and H. R. Kattelmann; said Kattelmann assignor to Fabricated Metals, Inc. Convertible valve for vacuum release or pressure relief. 223,094, 3–7–72, Cl. D23—19.

Donnelly, William B., to General Electric Co. Phonograph console. 223,052, 3–7–72, Cl. D56—4.

Eastman Kodak Co.: *See*—
Vigna, Ralph M. 223,055.

Ernest, Robert O., to Sunbeam Corp. Electric shaver. 223,076, 3–7–72, Cl. D95—3.

Fabricated Metals, Inc.: *See*—
Coleman, Clarence B., and Kattelmann. 223,094.

Finn Equipment Co., The: *See*—
Lingert, Ralph E., and Keyes. 223,051.

Freedman, Alan A., to Bergman Tool Mfg. Co., Inc. Battery carrier. 223,081, 3–7–72, Cl. D8—14.

Fromm, Jacob F., to Springfield Electrical Specialties, Inc. Bracket for automotive condensers. 223,082, 3–7–72, Cl. D8—233.

Genaro, Donald M., to The Singer Co. Sewing machine frame. 223,057, 3–7–72, Cl. D70—1.

Genaro, Donald M., to The Singer Co. Sewing machine frame or similar article. 223,058, 3–7–72, Cl. D70—1.

Genaro, Donald M., to The Singer Co. Sewing machine frame. 223,059, 3–7–72, Cl. D70—1.

Genaro, Donald M., to The Singer Co. Sewing machine attachment for making buttonholes or the like. 223,060, 3–7–72, Cl. D70—2.

General Electric Co.: *See*—
Donnelly, William B. 223,052.

Gilson, Channing W., to Infotechnics, Inc. Cabinet for processing data discs. 223,096, 3–7–72. Cl. D26—5.

Graham, Stanley T., and G. R. Rintoul. Drive point for explosive charge. 223,091, 3–7–72, Cl. D22—10.

Hanson, Thomas E., and J. E. Jolliffe, to Proctor-Silex Incorporated. Combined toaster and oven or the like. 223,066, 3–7–72, Cl. D81—10.

Heltzen, John H., and F. G. Stone. Motorcycle luggage carrier and backrest combination. 223,070, 3–7–72, Cl. D90—3.

Hinman, Ronald C., to Western Gear Corp. Portable loading vestibule. 223,087, 3–7–72, Cl. D13—1.

Hodge, Lynn H. Rear view mirror. 223,089, 3–7–72, Cl. D14—6.

Hodge, Lynn H. Stationary car-top mirror. 223,090, 3–7–72, Cl. D14—6.

Hoehne, George C.: *See*—
Catalano, Paul D., and Hoehne. 223,098.

Humlong, Robert F.: *See*—
Pawsat, Carlton P., and Humlong. 223,072.
Pawsat, Carlton P., and Humlong. 223,073.
Pawsat, Carlton P., and Humlong. 223,074.

Humlong, Robert F., and C. P. Pawsat, to Wald Mfg. Co., Inc. Reflective bicycle pedal. 223,075, 3–7–72, Cl. D90—14.

Infotechnics, Inc.: *See*—
Gilson, Channing W. 223,096.

Ivaco Corp.: *See*—
Sato, Stephens N. 223,050.
Sato, Stephens N. 223,999.

Jolliffe, John E.: *See*—
Hanson, Thomas E., and Jolliffe. 223,066.

Jones, Kenneth E., to SCOA Industries, Inc. Shoe heel. 223,078, 3–7–72, Cl. D2—323.

Jovanovich, Borislav D. Hanger. 223,063, 3–7–72, Cl. D80—8.

Kattelmann, Harry R.: *See*—
Coleman, Clarence B., and Kattelmann. 223,094.

Keyes, Richard E.: *See*—
Lingert, Ralph E., and Keyes. 223,051.

Kimmel, Irvine. Extruded H connector member. 223,088, 3–7–72, Cl. D13—6.

Kinsinger, William C. Metagraphic Systems, Inc. Microfilm viewer. 223,054, 3–7–72, Cl. D61—1.

Krumin, Donald K., and R. J. Toth, to Motorola, Inc. Radio pager or similar article. 223,097, 3–7–72, Cl. D26—14.

Lingert, Ralph E., and R. E. Keyes, to The Finn Equipment Co. Particulate material distributor for utilization on oil pollution spills. 223,051, 3–7–72, Cl. D55—1.

Long, Douglas G., and R. S. Waters, to Sunbeam Corp. Combined illuminable makeup mirror and vanity case. 223,068, 3–7–72, Cl. D86—10.
Luxenberg, Morris: *See*—
Benrube, Jack S. 223,077.
Majewski, Eugene J. Stamp pad or the like. 223,056, 3–7–72, Cl. D64—10.
Mattel, Inc.: *See*—
Zimmerman, Charles R., and Tuccio. 223,085.
Metagraphic Systems, Inc.: *See*—
Kinsinger, William C. 223,054.
Mohasco Industries, Inc.: *See*—
Peterson, James T. 223,064.
Motorola, Inc.: *See*—
Krumin, Donald K., and Toth. 223,097.
Murray Ohio Mfg. Co., The: *See*—
Schreckengost, Viktor. 223,071.
NAR Enterprises, Inc.: *See*—
Roy, Norman A. 223,080.
Owens-Illinois, Inc.: *See*—
Plummer, James E. 223,083.
Weckman, Richard L. 223,084.
Pawsat, Carlton P.: *See*—
Humlong, Robert F. and Pawsat. 223,075.
Pawsat, Carlton P., and R. F. Humlong, to Wald Mfg. Co., Inc. Reflective bicycle handlebar, 223,072, 3–7–72, Cl. D90—11.
Pawsat, Carlton P., and R. F. Humlong, to Wald Mfg. Co., Inc. Reflective bicycle pedal. 223,073. 3–7–72, Cl. D90—14.
Pawsat, Carlton P., and R. F. Humlong, to Wald Mfg. Co., Inc. Reflective bicycle pedal. 223,074, 3–7–72, Cl. D90—14.
Peterson, James T., to Mohasco Industries, Inc. Pillow display stand. 223,064, 3–7–72, Cl. D80—9.
Plummer, James E., to Owens-Illinois, Inc. Bottle. 223,083, 3–7–72, Cl. D9—113.
Proctor-Silex Inc.: *See*—
Hanson, Thomas E., and Jolliffe. 223,066.
Retention Communications Systems, Inc.: *See*—
Catalano, Paul D., and Hoehne. 223,098.
Rintoul, G. Robert: *See*—
Graham, Stanley T. and Rintoul. 223,091.
Rosen, Nathan: *See*—
Benrube, Jack S. 223,077.
Roth, Eric M. Clothing care implement. 223,069, 3–7–72, Cl. D86—13.
Roy, Norman A., to NAR Enterprises, Inc. Buckle. 223,080, 3–7–72, Cl. D2—446.
Royster, Ronald B., Sr. Rotatable surveillance capsule for buildings. 223,086, 3–7–72, Cl. D13—1.
SCOA Industries, Inc.: *See*—
Jones, Kenneth E. 223,078.
Sato, Stephens N., to Ivac Corp. Temperature probe. 223,050, 3–7–72, Cl. D52—7.
Sato, Stephens N., to Ivac Corp. Battery charger. 223,999, 3–7–72, Cl. D26—15.
Schreckengost, Viktor, to The Murray Ohio Mfg. Co. Bicycle frame. 223,071, 3–7–72, Cl. D90—8.
Singer Co., The: *See*—
Genaro, Donald M. 223,057.
Genaro, Donald M. 223,058.
Genaro, Donald M. 223,059.
Genaro, Donald M. 223,060.
Zylbert, Thaddeus J. 223,061.
Springfield Electrical Specialties, Inc.: *See*—
Fromm, Jacob F. 223,082.
Stanek, Leonard M. Bird feeder. 223,047, 3–7–72, Cl. D30—14.
Steinkamp, Norman A., to Sunbeam Corp. Electric hair dryer bonnet. 223,067, 3–7–72, Cl. D86—10.
Stone, Frank G.: *See*—
Heltzen, John H., and Stone. 223,070.
Sunbeam Corp.: *See*—
Ernest, Robert O. 223,076.
Long, Douglas G., and Waters. 223,068.
Steinkamp, Norman A. 223,067.
Tillinger, Edwin B. Turtle shell toy. 223,048, 3–7–72, Cl. D34—2.
Toth, Richard J.: *See*—
Krumin, Donald K., and Toth. 223,097.
Tuccio, Raymond: *See*—
Zimmerman, Charles R., and Tuccio. 223,085.
Tucker, Augusta, Jr. Beach insertable standard for pair of fishing poles with fish alarms. 223,092, 3–7–72, Cl. D22—22.
Turner, Anthon H., to Turner and Sons. Charcoal oven. 223,065, 3–7–72, Cl. D81—10.
Turner and Sons: *See*—
Turner, Anthon H. 223,065.
Vigna, Ralph M., to Eastman Kodak Co. Apparatus for processing film. 223,055, 3–7–72, Cl. D61—1.
Wald Mfg. Co., Inc.: *See*—
Humlong, Robert F. and Pawsat. 223,075.
Pawsat, Carlton P., and Humlong. 223,072.
Pawsat, Carlton P., and Humlong. 223,073.
Pawsat, Carlton P., and Humlong. 223,074.
Waters, Robert S.: *See*—
Long, Douglas G., and Waters. 223,068.
Weckman, Richard L. Owens-Illinois, Inc. Bottle. 223,084, 3–7–72, Cl. D9—116.
Western Gear Corp.: *See*—
Hinman, Ronald C. 223,087.
Woodruff, William E. Eyeglass frame front. 223,053, 3–7–72, Cl. D57—1.
Zakarin, Melvin V. Sash. 223,079, 3–7–72, Cl. D2—385.
Zimmerman, Charles R., and R. Tuccio, to Mattel, Inc. Combined display and storage case. 223,085, 3–7–72, Cl. D9—221.
Zylbert, Thaddeus J., to The Singer Co. Top cover for a sewing machine or similar article. 223,061, 3–7–72, Cl. D70—2.

CLASSIFICATION OF PATENTS

ISSUED MARCH 7, 1972

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2
91 3,646,614

CLASS 3
1 3,646,615
3,646,616

CLASS 4
3,646,617
147 3,646,618
203 3,646,619
237 3,646,620

CLASS 5
66 3,646,621
100 3,646,622
181 3,646,623
334 3,646,624

CLASS 8
4 3,647,349
10 3,647,350
10.2 3,647,351
116.2 3,647,352
116.3 3,647,353
130.1 3,647,355
158 3,647,354

CLASS 9
335 3,646,625
342 3,646,626

CLASS 13
20 3,647,924

CLASS 14
71 3,646,627

CLASS 15
48 3,646,629
118 3,646,628
302 3,646,630
308 3,646,631
339 3,646,632

CLASS 16
42 3,646,633
124 3,646,634
129 3,646,635
140 3,646,636

CLASS 17
1F 3,646,637
53 3,646,638

CLASS 19
97 3,646,639
159R 3,646,640

CLASS 23
1R 3,647,357
2R 3,647,358
3,647,359
18 3,647,361
22 3,647,362
25Q 3,647,363
51R 3,647,364
64 3,647,365
88 3,647,366
91 3,647,367
97 3,647,368
107 3,647,369
3,647,370
108 3,647,371
142 3,647,372
3,647,373
143 3,647,374
145 3,647,375
151 3,647,388
160 3,647,376
168 3,647,360
202V 3,647,377
202 3,647,383
204R 3,647,389
208 3,647,384
230PC 3,647,385
230R 3,647,386
232R 3,647,387
252R 3,647,390
254E 3,647,392
254R 3,647,391
281 3,647,393
288F 3,647,394
299 3,647,395
3,647,396
309 3,647,397
312S 3,647,398
360 3,647,399

CLASS 24
73CH 3,646,641
97 3,646,642
114.5 3,646,644
241SL 3,646,645

CLASS 26
69R 3,646,646

CLASS 28
1CL 3,646,647

CLASS 29
76 3,646,648
96 3,646,649
105 3,646,650
130 3,646,651
3,646,652
177 3,646,653
182.8 3,647,401
190 3,646,654
191 3,647,400
195 3,647,402
200A 3,646,656
200B 3,646,655
200 3,646,657
203B 3,646,659
205R 3,646,658
243.53 3,646,660
275 3,646,661
421 3,646,662
463 3,646,663
568 3,646,664
571 3,646,665
577 3,646,666
593 3,646,667
604 3,646,668
607 3,646,669
627 3,646,670

CLASS 30
4R 3,646,671
32 3,646,672
43.92 3,646,673
64 3,646,674
217 3,646,675

CLASS 32
2 3,646,676
26 3,646,677
3,646,678
47 3,646,679
71 3,646,680

CLASS 33
1SD 3,646,681
47 3,646,682
77 3,646,683
126.5 3,646,684
143 3,646,685
182 3,646,686

CLASS 34
13.8 3,646,687
168 3,646,688
182 3,646,689

CLASS 35
13 3,647,925
16 3,646,690
29R 3,646,691
48R 3,647,926

CLASS 36
2.5R 3,646,692

CLASS 37
8 3,646,693
195 3,646,694

CLASS 40
39 3,646,695
125H 3,646,696

CLASS 43
17 3,646,697
3,646,698
35 3,646,699
42.74 3,646,700
129 3,646,701

CLASS 44
6 3,647,403
62 3,647,404
70 3,647,378

CLASS 46
48 3,646,703
74A 3,646,702
90 3,646,704
157 3,646,705
201 3,646,706

CLASS 48
202 3,647,379

CLASS 49
227 3,646,707

CLASS 51
5 3,646,708
8 3,646,709
105SP 3,646,710
168 3,646,711
235 3,647,380
273 3,646,712
308 3,647,381
309 3,646,713

CLASS 52
79 3,646,718
115 3,646,719
241 3,646,714
309 3,646,715
403 3,646,716
548 3,646,717
618 3,646,721
641 3,646,725
744 3,646,720
745 3,646,722

CLASS 53
29 3,646,726
390 3,646,723

CLASS 55
21 3,646,727
233 3,646,728
274 3,646,724
278 3,646,729
302 3,646,730
313 3,646,734
316 3,646,731

CLASS 56
7 3,646,733
13.6 3,646,732
14.7 3,646,735
16.9 3,646,736
106 3,646,737
314 3,646,738
320.1 3,646,739
320.2 3,646,740
327R 3,646,742
328R 3,646,741

CLASS 57
5 3,646,743
34B 3,646,744
36 3,646,745
108 3,646,746
140 3,646,747
149 3,646,748
153 3,646,749

CLASS 58
28A 3,646,750
152 3,646,751

CLASS 59
78 3,646,752

CLASS 60
39.27 3,646,753
52VS 3,646,754
54 3,646,755
3,646,756
54.5HA 3,646,757
54.6P 3,646,758
54.6R 3,646,759
204 3,646,760
3,646,761
3,646,762
261 3,646,763
279 3,646,764

CLASS 61
.5 3,646,765
11 3,646,766
41 3,646,767
45D 3,646,768
3,646,769
46.5 3,646,770
69A 3,646,771

CLASS 62
62 3,646,772
160 3,646,773
188 3,646,774
216 3,646,775

CLASS 64
11R 3,646,776
15R 3,646,777
32 3,646,778

CLASS 65
12 3,647,382
19 3,647,405
30 3,647,406
3,647,407
99A 3,647,408
117 3,647,409
184 3,647,410

CLASS 66
25 3,646,779
85A 3,646,780
85 3,646,781
87 3,646,782
95 3,646,783

CLASS 68
20 3,646,784
175 3,646,785

CLASS 70
59 3,646,786
70 3,646,787

CLASS 71
1 3,647,411
29 3,647,416
59 3,647,412
98 3,647,413

CLASS 72
8 3,646,788
10 3,646,789
43 3,646,790
56 3,646,791
3,646,792
137 3,646,793
187 3,646,794
238 3,646,795
258 3,646,796
289 3,646,798
326 3,646,797
370 3,646,799
391 3,646,800
410 3,646,801

CLASS 73
17 3,646,802
27A 3,646,803
45.5 3,646,804
67.9 3,646,805
71.5 3,646,806
71.6 3,646,807
141A 3,646,809
155 3,646,808
161 3,646,810
182 3,646,811
190R 3,646,812
359 3,646,813
398AR 3,646,815
398R 3,646,814
425.4 3,646,816
425.6 3,646,817
517R 3,646,818

CLASS 74
3.5 3,646,819
6 3,646,820
10.33 3,646,821
10.45 3,646,823
16 3,646,824
53 3,646,822
63 3,646,825
142 3,646,826
424.8 3,646,827
484 3,646,828
513 3,646,829
516 3,646,830
518 3,646,831
519 3,646,832
589 3,646,833
674 3,646,834
860 3,646,835
864 3,646,836

CLASS 75
.5BB 3,647,415
1 3,647,414
35 3,647,417
82 3,647,418
3,647,419
84 3,647,420
84.1A 3,647,421
101 3,647,422
103 3,647,423
123AA 3,647,424
124 3,647,425
129 3,647,426

CLASS 81
10 3,646,837

CLASS 82
1C 3,646,838
1 3,646,839
82 3,646,840

CLASS 83
104 3,646,842
112 3,646,643
171 3,646,841

CLASS 84
1.01 3,647,929
1.18 3,647,927
1.24 3,647,928
318 3,647,930
411 3,647,931
419 3,646,843

CLASS 86
20A 3,646,845
20 3,646,844

CLASS 87
1 3,646,846

CLASS 89
1G 3,646,847

CLASS 90
11C 3,646,848

CLASS 91
52 3,646,849
391 3,646,850
459 3,646,851
467 3,646,852

CLASS 92
76 3,646,853
98 3,646,854

CLASS 93
1C 3,646,855
35R 3,646,856
37R 3,646,857
62 3,646,858

CLASS 95
10CT 3,646,859
3,646,860
10C 3,646,861
11UW 3,646,863
11.5R 3,646,864
3,646,865
31AC 3,646,862
3,646,867
42 3,646,868
53EB 3,646,869
59 3,646,870
64B 3,646,871
89R 3,646,873
89 3,646,872

CLASS 96
1.5 3,647,427
3,647,428
3,647,429
3,647,430
3,647,431
1.6 3,647,432
3,647,433
3 3,647,434
3,647,435
3,647,436
3,647,437
27 3,647,438
29R 3,647,439
29 3,647,440
3,647,441
3,647,442
33 3,647,443
3,647,444
35 3,647,445
35.1 3,647,446
3,647,447
38.4 3,647,456
41 3,647,457
45.2 3,647,458
48 3,647,448
3,647,450
50 3,647,449
52 3,647,451
55 3,647,452
61 3,647,453
64 3,647,455
66 3,647,460
3,647,461
3,647,462
66.5 3,647,459
67 3,647,454
68 3,647,463
76 3,647,464
78 3,647,465
90 3,647,467
99 3,647,466
100 3,647,468
107 3,647,469
115 3,647,470
116 3,647,471

CLASS 98
1.5 3,646,874
2.08 3,646,875
2.11 3,646,876
110 3,646,877

CLASS 99
34 3,647,472
52 3,647,473
83 3,647,474
86 3,646,894
105 3,647,475
3,647,476
136 3,647,477
137 3,647,478
140R 3,647,479
3,647,480
3,647,481
141A 3,647,482
3,647,483
145 3,647,484
174 3,647,485
186 3,647,486
225 3,647,487
339 3,646,878
3,646,879
349 3,646,880
351 3,646,881
408 3,646,882

CLASS 100
53 3,646,883

CLASS 101
33 3,646,884
328 3,646,885
378 3,646,886

CLASS 102
34.5 3,646,887
67 3,646,888
70B 3,646,889

CLASS 104
1 3,646,890
26R 3,646,891
148 3,646,892

CLASS 105
182R 3,646,893

CLASS 106
35 3,647,488
39DV 3,647,489
54 3,647,490
3,647,491
187 3,647,493
288Q 3,647,494
291 3,647,492
300 3,647,495
309 3,647,496

CLASS 108
118 3,646,895
139 3,646,896

CLASS 110
8A 3,646,897
14 3,646,898

CLASS 112

235 3,646,899
258 3,646,900

CLASS 114

.5 3,646,901
66.5H 3,646,902

CLASS 115

1 3,646,904
12R 3,646,903
70 3,646,905

CLASS 116

3,646,906

CLASS 117

5.5 3,647,497
8 3,647,498
17.5 3,647,499
21 3,647,500
34 3,647,501
36.1 3,647,502
36.4 3,647,503
36.7 3,647,504
37R 3,647,505
3,647,506
38 3,647,507
3,647,508
45 3,647,509
46CG 3,647,511
46FC 3,647,510
47A 3,647,512
3,647,513
3,647,514
62 3,647,515
64 3,647,516
71M 3,647,517
71R 3,647,518
3,647,519
93.31 3,647,520
95 3,647,521
100B 3,647,522
3,647,523
107.1 3,647,524
111 3,647,525
115 3,647,526
138.8A 3,647,527
155UA 3,647,528
161UN 3,647,529
201 3,647,530
211 3,647,531
212 3,647,532
3,647,533
3,647,534
3,647,535
227 3,647,536
3,647,537
234 3,647,538
235 3,647,539
3,647,540
239 3,647,541

CLASS 118

264 3,646,907
304 3,646,908
629 3,646,909
637 3,646,910

CLASS 119

51 3,646,911
51.12 3,646,912
51.13 3,646,913

CLASS 123

32EA 3,646,914
3,646,915
3,646,916
3,646,917
3,646,918
41.82 3,646,919
117A 3,646,920
3,646,921
3,646,922
119A 3,646,923
119B 3,646,925
120 3,646,924
148E 3,646,926

CLASS 126

39J 3,646,927
41R 3,646,928

CLASS 128

1R 3,646,929
2.05T 3,646,931
2.06F 3,646,930
95 3,646,932
145.8 3,646,933
212 3,646,934
276 3,646,935
283 3,646,936
287 3,646,937
292 3,646,938
321 3,646,939
421 3,646,940

CLASS 131

9 3,646,941
65 3,646,942
140C 3,646,943
187 3,646,944

CLASS 132

11 3,646,945

CLASS 134

3 3,646,946
57D 3,646,948
167C 3,646,947

CLASS 135

58 3,646,949

CLASS 136

6 3,647,542
3,647,543
20 3,647,586
24 3,647,544
26 3,647,545
43 3,647,546
75 3,647,547
82 3,647,548
83R 3,647,549
86A 3,647,550
122 3,647,551
131 3,647,552
134R 3,647,553
145 3,647,554
162 3,647,555
170 3,647,556
177 3,647,557
234 3,647,558
3,647,559
3,647,560

CLASS 137

13 3,646,950
81.5 3,646,951
3,646,952
155 3,646,953
318 3,646,954
382 3,646,955
525 3,646,956
3,646,957
553 3,646,958
565 3,646,960
577 3,646,961
594 3,646,962
596.12 3,646,959
608 3,646,963
614.03 3,646,964
614.06 3,646,965
625.4 3,646,966
625.47 3,646,967
625.64 3,646,968
627.5 3,646,969

CLASS 138

46 3,646,970
3,646,971
111 3,646,972

CLASS 139

153 3,646,973

CLASS 141

392 3,646,974

CLASS 144

34E 3,646,975
242R 3,646,976

CLASS 146

78R 3,646,977
83 3,646,978
189A 3,646,979

CLASS 148

1.6 3,647,561
2 3,647,562
3,647,563
3,647,564
3,647,565
6.15R 3,647,567
6.15Z 3,647,568
6.16 3,647,569
6.3 3,647,566
9.5 3,647,570
12.3 3,647,571
16.6 3,647,572
101 3,647,573
103 3,647,574
111 3,647,575
126 3,647,576
150 3,647,577
171 3,647,578
3,647,579
175 3,647,580
3,647,581

CLASS 150

52R 3,646,980

CLASS 151

41.7 3,646,981
3,646,982

CLASS 152

323 3,646,983

CLASS 156

3 3,647,582
6 3,647,583
11 3,647,584
17 3,647,585
71 3,647,587
79 3,647,588
165 3,647,589
211 3,647,590
220 3,647,591
285 3,647,592
300 3,647,593
306 3,647,594
331 3,647,595
345 3,647,596
415 3,647,598
502 3,647,599
504 3,647,600
511 3,647,601
528 3,647,602

CLASS 157

13 3,646,984

CLASS 160

168 3,646,985
3,646,986

CLASS 161

5 3,647,603
15 3,647,604
31 3,647,605
52 3,647,606
89 3,647,607
95 3,647,608
160 3,647,609
163 3,647,611
165 3,647,612
3,647,613
166 3,647,614
170 3,647,615
190 3,647,616
216 3,647,617

CLASS 162

161 3,647,610
205 3,647,618
206 3,647,619
211 3,647,620
274 3,647,621

CLASS 164

5 3,646,987
251 3,646,988
274 3,646,989
304 3,646,990
342 3,646,991

CLASS 165

1 3,646,992
9 3,646,993
69 3,646,994

CLASS 166

.5 3,646,995
212 3,646,996
250 3,646,997
276 3,646,998
281 3,646,999
285 3,647,000

CLASS 169

1A 3,647,001
16 3,647,002

CLASS 172

40 3,647,003
152 3,647,004
259 3,647,005
803 3,647,006

CLASS 174

34 3,647,932
43 3,647,933
65R 3,647,934
68.5 3,647,935
69 3,647,936
88B 3,647,937
128 3,647,939
143 3,647,938

CLASS 175

5 3,647,007
18 3,647,008
242 3,647,009

CLASS 176

68 3,647,622
3,647,623

CLASS 177

230 3,647,010

CLASS 178

5.4HE 3,647,941
5.4ST 3,647,943
3,647,945
3,647,946
3,647,947
3,647,948
5.4R 3,647,940
3,647,944
5.4 3,647,942
5.6 3,647,949
5.8A 3,647,950
6.6A 3,647,951
3,647,953
3,647,954
6.8 3,647,957
7.2 3,647,952
7.3D 3,647,958
7.6 3,647,955
3,647,956
7.8 3,647,960
7.85 3,647,961
7.87 3,647,959
17C 3,647,962
19 3,647,963
68 3,647,964
69.5CB 3,647,965
70R 3,647,966
88 3,647,967

CLASS 179

1F 3,647,969
1N 3,647,968
1.5 3,647,970
2DP 3,647,972
3,647,973
2A 3,647,971
5R 3,647,974
15AL 3,647,976
15BA 3,647,975
3,647,977
15A 3,647,978
18AH 3,647,981
18ES 3,647,979
3,647,980
81A 3,647,982
99 3,647,983
100.1DR 3,647,985
100.2MD 3,647,986
3,647,989
100.2R 3,647,988
100.2S 3,647,991
100.2Z 3,647,984
3,647,987
3,647,990
170.2 3,647,992
3,647,993

CLASS 180

6.48 3,647,011
8F 3,647,012
13 3,647,013
14 3,647,014
27 3,647,015
105R 3,647,016
105 3,647,017
124 3,647,018

CLASS 181

.5 3,647,019
33HC 3,647,020
3,647,021
33G 3,647,022

CLASS 182

23 3,647,023

CLASS 184

6.18 3,647,024

CLASS 185

39 3,647,025

CLASS 186

1C 3,647,026

CLASS 187

73 3,647,027

CLASS 188

1 3,647,028
32 3,647,029
72.3 3,647,030
72.6 3,647,031
112 3,647,032
251R 3,647,033
343 3,647,034

CLASS 190

45 3,647,035

CLASS 192

26 3,647,036
106F 3,647,037
141 3,647,038
146 3,647,039

CLASS 195

1.8 3,647,624
11 3,647,625
28N 3,647,626
3,647,627
29 3,647,628
30 3,647,629
63R 3,647,630
80 3,647,631
139 3,647,633
142 3,647,632

CLASS 196

132 3,647,634
3,647,635

CLASS 197

16 3,647,040
19 3,647,041
3,647,042

CLASS 198

3,647,043
31AC 3,647,044
41 3,647,045
127 3,647,046
174 3,647,047
177 3,647,048
192 3,647,049
203 3,647,050
204 3,647,051
233 3,647,052

CLASS 200

4 3,647,994
24 3,647,995
48 3,647,996
50C 3,647,997
61.42 3,647,998
61.45R 3,647,999
153S 3,648,000
157 3,648,001
166BB 3,648,003
166C 3,648,002
166H 3,648,004

CLASS 201

1 3,647,053

CLASS 202

263 3,647,636

CLASS 203

9 3,647,637
11 3,647,638
14 3,647,639
29 3,647,054
38 3,647,640

CLASS 204

1T 3,647,641
11 3,647,642
15 3,647,643
3,647,644
3,647,645
25 3,647,646
32R 3,647,647
34 3,647,648
35N 3,647,649
35R 3,647,650
43 3,647,652
73A 3,647,651
130 3,647,653
140.5 3,647,654
158R 3,647,655
3,647,656
168 3,647,657
181 3,647,658
3,647,659
3,647,660
3,647,661
192 3,647,662
3,647,663
3,647,664
194 3,647,665
195 3,647,666
3,647,668
212 3,647,669
219 3,647,670
224 3,647,671
244 3,647,673
284 3,647,672
3,647,674
299 3,647,667
300 3,647,675
312 3,647,676

CLASS 206

1R 3,647,055
5 3,647,056
17 3,647,057
56AC 3,647,058
58 3,647,059
3,647,060
83.5 3,647,061

CLASS 208

48 3,647,677
59 3,647,678
63 3,647,679
65 3,647,680
111 3,647,681
120 3,647,682
196 3,647,683

CLASS 209

3 3,647,062
74 3,647,063
80.5 3,647,064
88 3,647,065
169 3,647,066
242 3,647,067
310 3,647,068

CLASS 210

31 3,647,684
39 3,647,685
44 3,647,069
48 3,647,686
63 3,647,687
83 3,647,070
107 3,647,071
150 3,647,081
225 3,647,082
236 3,647,083
492 3,647,084
500 3,647,085
3,647,086

CLASS 211

1.3 3,647,073
4 3,647,072
40 3,647,074
88 3,647,076
126 3,647,077
134 3,647,078
153 3,647,075
176 3,647,079
3,647,080

CLASS 212

59 3,647,087

CLASS 213

8 3,647,088

CLASS 214

1BB 3,647,090
1A 3,647,089
6B 3,647,091
6S 3,647,092
8.5C 3,647,093
17DA 3,647,094
41 3,647,095
83.36 3,647,096
506 3,647,097
508 3,647,098
674 3,647,099

CLASS 219

8.5 3,648,005
58 3,648,006
59 3,648,007
67 3,648,008
69D 3,648,013
118 3,648,014
121EM 3,648,009
121P 3,648,015
142 3,648,016
213 3,648,017
214 3,648,010
271 3,648,018
386 3,648,019
413 3,648,011
3,648,012

CLASS 220

1.5 3,647,100
3 3,647,103
4R 3,647,101
17 3,647,102
20 3,647,104
23.4 3,647,105
26D 3,647,113
31R 3,647,106
46 3,647,108
47 3,647,109
60R 3,647,107
72 3,647,110
83 3,647,111
97D 3,647,112

CLASS 221

59 3,647,114

CLASS 222

39 3,647,115
70 3,647,116
100 3,647,117
145 3,647,118
402.18 3,647,119
402.22 3,647,120
402.24 3,647,121
501 3,647,122

CLASS 226

22 3,647,123
46 3,647,124
62 3,647,125
105 3,647,126
155 3,647,127
195 3,647,128

CLASS 227

112 3,647,129

CLASS 228

5 3,647,130
3,647,131

CLASS 229

2.5 3,647,132
37 3,647,133
55 3,647,134

CLASS 233

1A 3,647,135

CLASS 235

61.11D 3,648,023
61.11E 3,648,024
61.7B 3,648,020
3,648,021
61.9R 3,648,022
83 3,648,025
92DN 3,648,029
92PD 3,648,026
92PL 3,648,030
92QC 3,648,027
92C 3,648,028
150.1 3,648,031
150.21 3,648,033
150.26 3,648,034
150.5 3,648,032
151.1 3,648,035
154 3,648,036
164 3,648,038

181 3,648,039
3,648,040
186 3,648,041
189 3,648,042
197 3,648,037
3,648,043

CLASS 237
8 3,647,136

CLASS 239
102 3,647,137
104 3,647,138
177 3,647,139
242 3,647,140
265.29 3,647,141
288.3 3,647,142
342 3,647,143
456 3,647,144
460 3,647,145
559 3,647,146
599 3,647,147

CLASS 240
8.16 3,648,044
44.2 3,648,045
93 3,647,148

CLASS 241
65 3,647,149
75 3,647,150
92 3,647,151

CLASS 242
55.2 3,647,158
55.53 3,647,159
60 3,647,152
82 3,647,153
83 3,647,154
106 3,647,155
118.1 3,647,156
191 3,647,157

CLASS 244
1N 3,647,160
3.2 3,647,161
3,647,162
49 3,647,163
63 3,647,164
102A 3,647,166
118P 3,647,165
121 3,647,167
122A 3,647,168
129 3,647,169
136 3,647,170

CLASS 248
221 3,647,171
361R 3,647,172

CLASS 249
31 3,647,173

CLASS 250
41.9DS 3,648,046
41.9G 3,648,047
49.5A 3,648,048
71.5R 3,648,049
208 3,648,050
211J 3,648,051
213R 3,648,052
214P 3,648,053
223R 3,648,054
231R 3,648,055
239 3,648,056

CLASS 251
1 3,647,174
61 3,647,175
122 3,647,176
129 3,647,177
148 3,647,178
172 3,647,179
306 3,647,180
317 3,647,181
361 3,647,182

CLASS 252
8.55C 3,647,688
25 3,647,689
33.3 3,647,690
51.5A 3,647,691
3,647,692
3,647,694
57 3,647,693
62 3,647,695
62.1 3,647,696
62.9 3,647,697
79.2 3,647,699
79.4 3,647,698
89 3,647,700
180 3,647,703
182 3,647,701
3,647,702
3,647,704
301.2R 3,647,705
301.4P 3,647,706
301.4S 3,647,707
301.6R 3,647,708
317 3,647,709
319 3,647,710
344 3,647,711
364 3,647,712
408 3,647,713
417 3,647,714
429R 3,647,715
445 3,647,716
455Z 3,647,717
3,647,718
466PT 3,647,719
476 3,647,720

CLASS 254
2B 3,647,183
29A 3,647,184
30 3,647,185
78 3,647,186

CLASS 259
4 3,647,187
3,647,188
45 3,647,189
104 3,647,190

CLASS 260
2.5AJ 3,647,724
2.5AK 3,647,721
2.5B 3,647,723
2.5F 3,647,722
18EP 3,647,726
18S 3,647,725
3,647,727
18 3,647,728
23AR 3,647,729
23R 3,647,730
23.7R 3,647,731
28.5AV 3,647,733
28.5 3,647,732
29.4R 3,647,734
29.6RW 3,647,735
29.6WB 3,647,736
31.6 3,647,737
32.6R 3,647,738
33.6UA 3,647,739
37AL 3,647,743
37EP 3,647,742
37SB 3,647,740
37 3,647,741
38 3,647,744
41R 3,647,745
45.75K 3,647,746
45.75R 3,647,747
45.75 3,647,748
45.85 3,647,749
49 3,647,751
63R 3,647,753
67FP 3,647,754
67.6R 3,647,755
72.5 3,647,757
73R 3,647,756
75M 3,647,758
75R 3,647,759
77.5BB 3,647,760
78SC 3,647,763
78TF 3,647,762
78UA 3,647,765
78P 3,647,764
78R 3,647,761
79 3,647,766
80.7 3,647,767
80.78 3,647,768
85.5S 3,647,770
85.5 3,647,769
86.7 3,647,771
88.2 3,647,772
88.7 3,647,773
94.2R 3,647,774
112.5 3,647,775
143 3,647,776
3,647,777
153 3,647,778
210R 3,647,779
239.1 3,647,780
3,647,781
3,647,783
239.3R 3,647,782
239.55R 3,647,784
240J 3,647,785
243C 3,647,786
3,647,787
3,647,788
3,647,789
244R 3,647,790
249.6 3,647,794
250R 3,647,792
3,647,793
268SY 3,647,795
268TR 3,647,791
268T 3,647,803
279R 3,647,796
281 3,647,797
3,647,798
286R 3,647,799
287A 3,647,801
287R 3,647,800
288 3,647,802
293.54 3,647,806
293.63 3,647,804
293.77 3,647,805
295.5R 3,647,807
296R 3,647,808
3,647,809
299 3,647,810
302SD 3,647,811
304 3,647,812
307C 3,647,813
308R 3,647,814
309 3,647,815
3,647,816
309.2 3,647,817
310C 3,647,818
3,647,819
340.9 3,647,820
3,647,821
343.6 3,647,822
347.5 3,647,824
347.8 3,647,823
3,647,825
348C 3,647,826
372 3,647,827
380 3,647,828
397.4 3,647,829
3,647,830
397.45 3,647,831
429J 3,647,832
429R 3,647,835
429.7 3,647,833
3,647,836
429.9 3,647,834
437R 3,647,837
3,647,838
3,647,839
3,647,844
438.1 3,647,840
3,647,843
439R 3,647,842
3,647,845
439 3,647,841
448.2E 3,647,846
453AB 3,647,848
454 3,647,849
455A 3,647,850
459 3,647,851
463 3,647,852
3,647,853
465U 3,647,856
465.1 3,647,854
465.8R 3,647,855
468P 3,647,857
470 3,647,858
473R 3,647,859
475FR 3,647,860
475P 3,647,750
481R 3,647,861
489 3,647,847
491 3,647,862
501.18 3,647,863
515P 3,647,864
518R 3,647,865
524R 3,647,866
530W 3,647,867
534M 3,647,868
535P 3,647,869
543R 3,647,870
544Y 3,647,871
555A 3,647,872
556AC 3,647,873
556F 3,647,874
561HL 3,647,876
561B 3,647,875
562N 3,647,877
564R 3,647,878
570.5C 3,647,879
587 3,647,880
591 3,647,881
601R 3,647,882
607A 3,647,884
608 3,647,885
609E 3,647,752
610B 3,647,886
611A 3,647,887
612R 3,647,888
615R 3,647,889
617C 3,647,890
633 3,647,891
635R 3,647,892
646 3,647,893
650R 3,647,894
3,647,895
666PY 3,647,897
666A 3,647,896
668A 3,647,898
668 3,647,899
674R 3,647,900
680B 3,647,901
3,647,902
3,647,903
681 3,647,913
681.5R 3,647,906
683D 3,647,908
3,647,907
683.15D 3,647,883
3,647,912
3,647,914
3,647,915
683.3R 3,647,910
683.3 3,647,909
3,647,911
683.4 3,647,905
683.43 3,647,916
825 3,647,917
830TW 3,647,918
842 3,647,919
857PI 3,647,920
861 3,647,904
873 3,647,921
876B 3,647,922
878 3,647,923

CLASS 261
111 3,647,191
114R 3,647,192

CLASS 263
1 3,647,193
6B 3,647,194
33B 3,647,196
33 3,647,195
47R 3,647,197

CLASS 266
34LM 3,647,198

CLASS 267
124 3,647,199

CLASS 269
51 3,647,200

CLASS 270
73 3,647,201

CLASS 271
19 3,647,202
30A 3,647,203
36 3,647,204
57 3,647,205
3,647,206
61 3,647,207
64 3,647,208

CLASS 272
58 3,647,209
83A 3,647,210

CLASS 273
73C 3,647,211
85B 3,647,212
101 3,647,213
105.6 3,647,214
123R 3,647,215
3,647,216
134G 3,647,217
157R 3,647,218
185D 3,647,219
194A 3,647,220
235 3,647,221

CLASS 274
1R 3,647,222
4R 3,647,225
9R 3,647,223
23R 3,647,224

CLASS 277
35 3,647,226
40 3,647,227
96 3,647,228
207 3,647,229
212 3,647,230

CLASS 279
4 3,647,231
68 3,647,232

CLASS 280
11.35C 3,647,234
11.35T 3,647,233
3,647,235
41R 3,647,236
47.24 3,647,237
47.29 3,647,238
124F 3,647,239
150 3,647,240
221 3,647,241
298 3,647,242
433 3,647,243
512 3,647,244

CLASS 285
106 3,647,245
114 3,647,246
229 3,647,247

CLASS 287
20.5R 3,647,248
90R 3,647,249

CLASS 292
67 3,647,250
111 3,647,251
357 3,647,252

CLASS 294
66 3,647,253
78 3,647,254
111 3,647,255

CLASS 296
91 3,647,256
3,647,257
102 3,647,258

CLASS 297
194 3,647,259
219 3,647,260

CLASS 299
4 3,647,261
11 3,647,262
31 3,647,263
3,647,264
90 3,647,265

CLASS 301
31 3,647,266

CLASS 303
21P 3,647,267

CLASS 305
10 3,647,270

CLASS 307
10AT 3,648,058
10R 3,648,057
127 3,648,059
213 3,648,064
215 3,648,060
218 3,648,061
220 3,648,062
221C 3,648,063
3,648,065
3,648,066
228 3,648,067
3,648,068
235 3,648,069
3,648,070
237 3,648,071
246 3,648,073
247 3,648,072
252B 3,648,075
3,648,076
3,648,077
252N 3,648,074
260 3,648,078
289 3,648,079
293 3,648,080

CLASS 308
3.6 3,647,271
9 3,647,272
193 3,647,268
201 3,647,269
217 3,647,273

CLASS 310
8.1 3,648,081
10 3,648,082
11 3,648,083
13 3,648,084
54 3,648,085
63 3,648,086
93 3,648,087
178 3,648,088
186 3,648,089
191 3,648,090
260 3,648,091

CLASS 312
257 3,647,274

CLASS 313
209 3,648,092
217 3,648,093
221 3,648,094
317 3,648,095
346R 3,648,096

CLASS 315
24 3,648,097
26 3,648,098
27GD 3,648,099
39 3,648,100
82 3,648,101
133 3,648,102
136 3,648,103
151 3,648,104
237 3,648,105
291 3,648,106
360 3,648,107

CLASS 317
2B 3,648,109
2R 3,648,108
16 3,648,110
18A 3,648,111
27R 3,648,112
100 3,648,113
101CP 3,648,114
101DH 3,648,115
101A 3,648,116
156 3,648,117
230 3,648,118
3,648,126
232 3,648,119
234E 3,648,121
234 3,648,122
235N 3,648,120
235R 3,648,123
3,648,124
3,648,128
3,648,129
3,648,130
3,648,131
235 3,648,125
3,648,127
261 3,648,132
262A 3,648,133

CLASS 318
6 3,648,134
101 3,648,135
128 3,648,136
138 3,648,137
231 3,648,138
265 3,648,139
282 3,648,140
314 3,648,141
345 3,648,142
568 3,648,143
696 3,648,144

CLASS 320
13 3,648,145
25 3,648,146
39 3,648,189

CLASS 321
2 3,648,147
5 3,648,148
3,648,149
9A 3,648,150
43 3,648,151

CLASS 322
2 3,648,152

CLASS 323
1 3,648,153
22T 3,648,154
94H 3,648,155

CLASS 324
.5R 3,648,156
.5 3,648,157
30B 3,648,158
3,648,160
30R 3,648,159
34 3,648,161
36 3,648,162
51 3,648,163
58.5A 3,648,164
60R 3,648,165
110 3,648,166
115 3,648,175
158D 3,648,168
158F 3,648,169
158T 3,648,167
3,648,170

CLASS 325
42 3,648,171
51 3,648,172
58 3,648,173
64 3,648,174
133 3,648,176
141 3,648,177
145 3,648,178
399 3,648,179

CLASS 328
59 3,648,180
3,648,181
160 3,648,182
196 3,648,183

CLASS 329
198 3,648,184

CLASS 330
5 3,648,185
10 3,648,186
21 3,648,187
26 3,648,188
107 3,648,190
192 3,648,191

CLASS 331
94.5 3,648,192
3,648,193
3,648,194

CLASS 332
14 3,648,195
16T 3,648,196

CLASS 333
17 3,648,197
31A 3,648,198
73W 3,648,200
73 3,648,199
95R 3,648,201

CLASS 334
47 3,648,202

CLASS 335
132 3,648,203
170 3,648,204

CLASS 336
20 3,648,205
160 3,648,206
206 3,648,207
208 3,648,208
220 3,648,209

CLASS 337
161 3,648,210
202 3,648,211
311 3,648,214

CLASS 338
53 3,648,212
122 3,648,215
142 3,648,216
143 3,648,217

160	3,648,218
CLASS 339	
14R	3,648,222
17R	3,648,220
45M	3,648,219
59R	3,648,213
74R	3,648,221
75M	3,648,223
183	3,648,224
CLASS 340	
3D	3,648,225
5R	3,648,226
15.5TD	3,648,227
23	3,648,228
26	3,648,229
27NA	3,648,230
	3,648,231
27R	3,648,232
46	3,648,233
62	3,648,234
110	3,648,235
146.1	3,648,236
	3,648,237
	3,648,238
	3,648,239
146.3E	3,648,240
147R	3,648,241
149	3,648,242
152	3,648,243
172.5	3,648,244
	3,648,245
	3,648,246
	3,648,247
	3,648,248
	3,648,249
	3,648,250
	3,648,251
	3,648,252
	3,648,253
	3,648,254
	3,648,255
	3,648,256
173LS	3,648,257
	3,648,258
174PW	3,648,259
174SP	3,648,261
174TF	3,648,260
174M	3,648,262
174.1E	3,648,263
174.1F	3,648,264
174.1G	3,648,265
254	3,648,266
263	3,648,267
276	3,648,268
324A	3,648,270
	3,648,271
	3,648,272
326	3,648,273
332	3,648,274
347AD	3,648,277
	3,648,278
347DA	3,648,275
347P	3,648,276
365	3,648,279
366	3,648,280
373	3,648,269
	3,648,281
421	3,648,282
CLASS 343	
5EM	3,648,283
5R	3,648,284
6.5R	3,648,285
7.3	3,648,286
18E	3,648,287
108R	3,648,288
CLASS 346	
101	3,647,356
CLASS 350	
3.5	3,647,275
16	3,647,276
96R	3,647,277
157	3,647,278
160R	3,647,280
160	3,647,279
222	3,647,281
225	3,647,282
293	3,647,283
294	3,647,284
319	3,647,285
CLASS 351	
38	3,647,287
CLASS 352	
174	3,647,288
CLASS 355	
2	3,647,289
3	3,647,290
	3,647,291
	3,647,292
15	3,646,866
	3,647,293
	3,647,294
17	3,647,286
38	3,647,295
	3,647,296
68	3,647,297
CLASS 356	
5	3,647,298
41	3,647,299
73	3,647,300
103	3,647,301
106LR	3,647,303
106	3,647,302
246	3,647,304
CLASS 401	
7	3,647,305
CLASS 402	
48	3,647,306
CLASS 408	
181	3,647,307
239	3,647,310
CLASS 415	
113	3,647,311
115	3,647,313
149	3,647,312
206	3,647,314
CLASS 416	
31	3,647,315
97	3,647,316
157	3,647,320
226	3,647,317
233	3,647,318
CLASS 417	
143	3,647,319
217	3,647,322
222	3,647,321
234	3,647,323
420	3,647,324
508	3,647,325
517	3,647,326
CLASS 418	
61	3,647,327
136	3,647,328
CLASS 425	
4	3,647,329
76	3,647,330
77	3,647,331
78	3,647,332
	3,647,333
83	3,647,597
110	3,647,334
111	3,647,308
139	3,647,309
143	3,647,335
146	3,647,336
242	3,647,337
247	3,647,338
326	3,647,339
	3,647,340
	3,647,341
330	3,647,342
350	3,647,343
379	3,647,344
439	3,647,345
466	3,647,346
CLASS 431	
37	3,647,347
CLASS 444	
1	3,647,348

CLASSIFICATION OF DESIGNS

D 2— 28	223,077
323	223,078
385	223,079
446	223,080
D 8— 14	223,081
233	223,082
D 9— 113	223,083
221	223,085
D13— 1	223,086
6	223,087
	223,088
D14—	223,089
	223,090
D22— 10	223,091
22	223,092
D23— 10	223,093
19	223,094
	223,095
D26— 5	223,096
14	223,097
	223,098
15	223,099
D30— 14	223,047
D34— 2	223,048
D52—	223,049
7	223,050
D55— 1	223,051
D56— 4	223,052
D57— 1	223,053
D61—	223,054
	223,055
D64— 10	223,056
D70— 1	223,057
	223,058
	223,059
2	223,060
	223,061
D71— 1	223,062
D80— 8	223,063
9	223,064
D81— 10	223,065
	223,066
D86—	223,067
	223,068
13	223,069
D90— 8	223,071
11	223,072
14	223,073
	223,074
	223,075
30	223,070
D95— 3	223,076

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

8— 130.1	896,012
95— 11V	896,020
96— 33	896,019
99—171LP	896,016
117—37LE	896,011
76T	896,018
136	896,010
138.8F	896,015
161UF	896,002
218	896,005
136— 173	896,007
161— 60	896,014
260—37N	896,009
79.5B	896,004
86.1R	896,013
93.7	896,006
475R	896,008
617C	896,001
618R	896,003
264— 321	896,017

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama..... 1
Alaska..... 2
American Samoa..... 3
Arizona..... 4
Arkansas..... 5
California..... 6
Canal Zone..... 7
Colorado..... 8
Connecticut..... 9
Delaware..... 10
District of Columbia..... 11
Florida..... 12
Georgia..... 13
Guam..... 14
Hawaii..... 15
Idaho..... 16
Illinois..... 17
Indiana..... 18
Iowa..... 19
Kansas..... 20
Kentucky..... 21
Louisiana..... 22
Maine..... 23
Maryland..... 24
Massachusetts..... 25
Michigan..... 26
Minnesota..... 27
Mississippi..... 28
Missouri..... 29
Montana..... 30
Nebraska..... 31
Nevada..... 32
New Hampshire..... 33
New Jersey..... 34
New Mexico..... 35
New York..... 36
North Carolina..... 37
North Dakota..... 38
Ohio..... 39
Oklahoma..... 40
Oregon..... 41
Pennsylvania..... 42
Puerto Rico..... 43
Rhode Island..... 44
South Carolina..... 45
South Dakota..... 46
Tennessee..... 47
Texas..... 48
Utah..... 49
Vermont..... 50
Virginia..... 51
Virgin Islands..... 52
Washington..... 53
West Virginia..... 54
Wisconsin..... 55
Wyoming..... 56
U.S. Air Force..... 57
U.S. Army..... 58
U.S. Navy..... 59

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 : 3,646,714
3,646,740
3,646,818
3,646,884
3,647,005
3,647,324
3,647,395
3,647,591
3,647,924
4 : 3,646,648
3,646,678
3,646,761
3,646,978
3,647,935
3,647,956
3,648,069
3,648,154
3,648,168
5 : 3,647,241
3,647,328
6 : 3,646,617
3,646,619
3,646,621
3,646,660
3,646,662
3,646,683
3,646,694
3,646,697
3,646,703
3,646,704
3,646,706
3,646,718
3,646,738
3,646,760
3,646,763
3,646,771
3,646,786
3,646,807
3,646,827
3,646,847
3,646,863
3,646,881
3,646,888
3,646,889
3,646,903
3,646,906
3,646,912
3,646,922
3,646,954
3,646,959
3,646,965
3,646,967
3,646,977
3,646,980
3,646,982
3,646,995
3,647,007
3,647,009
3,647,020
3,647,021
3,647,028
3,647,042
3,647,069
3,647,115
3,647,141
3,647,160
3,647,164
3,647,165
3,647,167
3,647,184
3,647,199
3,647,209
3,647,213
3,647,215
3,647,226
3,647,231
3,647,232
3,647,236
3,647,243
3,647,245
3,647,246
3,647,252
3,647,266
3,647,284
3,647,291
3,647,315
3,647,317
3,647,348
3,647,385
3,647,387
3,647,394
3,647,471
3,647,475
3,647,476
3,647,505
3,647,516
3,647,524
3,647,529
3,647,539
3,647,542
3,647,554
3,647,572
3,647,584
3,647,639
3,647,645
3,647,676
3,647,678
3,647,681
3,647,713
3,647,736
3,647,818
3,647,842
3,647,845
3,647,851
3,647,868
3,647,870
3,647,898
3,647,899
3,647,906
3,647,914
3,647,915
3,647,927
3,647,936
3,647,942
3,647,943
3,647,951
3,647,952
3,647,959
3,647,983
3,647,991
3,647,999
3,648,000
3,648,013
3,648,021
3,648,036
3,648,038
3,648,045
3,648,047
3,648,051
3,648,059
3,648,071
3,648,072
3,648,073
3,648,075
3,648,119
3,648,125
3,648,127
3,648,134
3,648,152
3,648,162
3,648,176
3,648,187
3,648,191
3,648,192
3,648,193
3,648,200
3,648,206
3,648,217
3,648,218
3,648,229
3,648,232
3,648,238
3,648,250
3,648,263
3,648,265
3,648,285
3,648,287
8 : 3,646,679
3,647,029
3,647,091
3,647,219
3,647,361
3,647,380
3,647,540
3,647,683
3,647,980
3,648,001
3,648,046
3,648,141
3,648,159
9 : 3,646,698
3,646,753
3,646,854
3,646,887
3,646,944
3,646,946
3,646,952
3,647,057
3,647,111
3,647,120
3,647,177
3,647,224
3,647,269
3,647,365
3,647,479
3,647,512
3,647,552
3,647,674
3,647,684
3,647,698
3,647,783
3,647,858
3,647,920
3,647,962
3,648,041
3,648,142
3,648,158
3,648,239
3,648,270
3,648,278
10 : 3,646,747
3,646,845
3,647,388
3,647,467
3,647,477
3,647,498
3,647,528
3,647,557
3,647,651
3,647,688
3,647,733
3,647,759
3,647,817
3,647,830
3,647,856
3,647,861
3,647,901
11 : 3,648,083
3,648,256
12 : 3,646,636
3,646,699
3,646,712
3,646,741
3,646,774
3,646,804
3,646,879
3,647,023
3,647,203
3,647,238
3,647,253
3,647,519
3,647,647
3,647,761
3,647,925
3,648,037
3,648,067
3,648,146
3,648,275
3,648,279
13 : 3,646,979
3,647,363
3,647,399
3,647,562
3,647,563
3,647,564
3,647,565
3,647,939
3,647,972
16 : 3,646,725
17 : 3,646,623
3,646,633
3,646,654
3,646,657
3,646,669
3,646,680
3,646,709
3,646,723
3,646,734
3,646,735
3,646,739
3,646,743
3,646,765
3,646,798
3,646,813
3,646,821
3,646,823
3,646,840
3,646,841
3,646,866
3,646,877
3,646,878
3,646,880
3,646,882
3,646,883
3,646,885
3,646,913
3,646,928
3,646,936
3,646,941
3,646,957
3,646,990
3,646,991
3,647,003
3,647,006
3,647,026
3,647,036
3,647,056
3,647,059
3,647,072
3,647,083
3,647,094
3,647,127
3,647,158
3,647,159
3,647,173
3,647,211

3,647,212
3,647,216
3,647,220
3,647,225
3,647,227
3,647,248
3,647,251
3,647,259
3,647,286
3,647,288
3,647,332
3,647,368
3,647,378
3,647,421
3,647,474
3,647,480
3,647,487
3,647,520
3,647,522
3,647,593
3,647,602
3,647,609
3,647,634
3,647,635
3,647,637
3,647,649
3,647,675
3,647,677
3,647,680
3,647,692
3,647,702
3,647,705
3,647,719
3,647,722
3,647,732
3,647,803
3,647,849
3,647,909
3,647,911
3,647,934
3,647,958
3,647,973
3,647,986
3,647,989
3,647,990
3,647,995
3,647,996
3,648,010
3,648,022
3,648,112
3,648,126
3,648,143
3,648,183
3,648,190
3,648,203
3,648,207
3,648,214
3,648,224
3,648,247
18 : 3,646,620
3,646,622
3,646,717
3,646,727
3,646,755
3,646,758
3,646,817
3,646,850
3,646,852
3,646,937
3,646,938
3,647,030
3,647,031
3,647,032
3,647,033
3,647,034
3,647,045
3,647,273
3,647,308
3,647,556
3,647,739
3,647,747
3,647,786
3,647,787
3,647,793
3,647,834
3,647,944
3,648,118
3,648,135
19 : 3,646,733
3,647,150
3,647,196
3,647,997
3,648,031
3,648,070
3,648,188
3,648,233
20 : 3,646,833
3,646,893
21 : 3,646,931
3,647,144
3,647,242
3,647,293
3,647,354
3,647,567
3,647,704
3,647,900

3,647,985
3,648,223
3,648,249
3,648,271
22 : 3,646,744
3,646,999
3,647,352
3,647,777
3,647,837
3,647,838
23 : 3,646,638
3,647,132
24 : 3,646,702
3,646,814
3,647,050
3,647,104
3,647,170
3,647,214
3,647,403
3,647,521
3,647,533
3,647,595
3,647,665
3,647,974
3,648,100
3,648,161
3,648,173
3,648,199
3,648,226
3,648,237
3,648,284
25 : 3,646,700
3,646,749
3,646,800
3,646,809
3,646,822
3,646,865
3,646,907
3,646,924
3,647,001
3,647,061
3,647,065
3,647,122
3,647,147
3,647,171
3,647,193
3,647,275
3,647,278
3,647,299
3,647,335
3,647,344
3,647,346
3,647,373
3,647,391
3,647,434
3,647,435
3,647,437
3,647,441
3,647,442
3,647,508
3,647,587
3,647,592
3,647,616
3,647,632
3,647,657
3,647,662
3,647,685
3,647,706
3,647,968
3,647,993
3,648,014
3,648,169
3,648,181
3,648,194
3,648,219
3,648,252
3,648,258
3,648,269
3,648,273
26 : 3,646,644
3,646,645
3,646,650
3,646,685
3,646,691
3,646,696
3,646,707
3,646,729
3,646,731
3,646,756
3,646,759
3,646,794
3,646,797
3,646,828
3,646,829
3,646,830
3,646,831
3,646,876
3,646,890
3,646,909
3,646,917
3,646,918
3,646,920
3,646,921
3,646,923
3,646,925
3,646,934

3,646,949
3,646,968
3,646,993
3,647,016
3,647,017
3,647,048
3,647,099
3,647,145
3,647,197
3,647,221
3,647,228
3,647,230
3,647,261
3,647,285
3,647,333
3,647,337
3,647,343
3,647,393
3,647,504
3,647,511
3,647,568
3,647,588
3,647,604
3,647,610
3,647,612
3,647,614
3,647,617
3,647,654
3,647,664
3,647,699
3,647,726
3,647,740
3,647,744
3,647,749
3,647,796
3,647,804
3,647,836
3,647,846
3,647,883
3,647,894
3,647,917
3,647,963
3,647,998
3,648,002
3,648,017
3,648,018
3,648,039
3,648,043
3,648,062
3,648,078
3,648,144
3,648,228
27 : 3,646,615
3,646,658
3,646,684
3,646,751
3,646,752
3,646,811
3,646,894
3,646,904
3,646,964
3,647,011
3,647,114
3,647,118
3,647,155
3,647,183
3,647,218
3,647,237
3,647,305
3,647,472
3,647,482
3,647,543
3,647,545
3,647,667
3,647,874
3,647,890
3,647,891
3,647,976
3,648,019
3,648,056
3,648,105
3,648,257
28 : 3,646,693
3,646,719
3,647,412
29 : 3,646,671
3,646,690
3,646,930
3,646,940
3,646,947
3,647,047
3,647,191
3,647,371
3,647,382
3,647,492
3,647,615
3,647,691
3,647,731
3,647,732
3,648,268
30 : 3,647,256
31 : 3,646,897
3,647,106
32 : 3,646,926
33 : 3,647,067
3,648,210

34 : 3,646,624
3,646,637
3,646,656
3,646,666
3,646,766
3,646,784
3,646,872
3,646,873
3,646,886
3,646,901
3,646,986
3,647,107
3,647,121
3,647,163
3,647,186
3,647,247
3,647,277
3,647,280
3,647,303
3,647,311
3,647,316
3,647,323
3,647,358
3,647,381
3,647,389
3,647,406
3,647,413
3,647,414
3,647,419
3,647,423
3,647,424
3,647,438
3,647,457
3,647,481
3,647,494
3,647,495
3,647,538
3,647,570
3,647,573
3,647,579
3,647,585
3,647,603
3,647,652
3,647,697
3,647,700
3,647,710
3,647,718
3,647,738
3,647,742
3,647,748
3,647,760
3,647,763
3,647,770
3,647,776
3,647,781
3,647,792
3,647,795
3,647,802
3,647,820
3,647,826
3,647,833
3,647,835
3,647,862
3,647,880
3,647,912
3,647,916
3,647,940
3,647,945
3,647,946
3,647,992
3,648,003
3,648,093
3,648,094
3,648,110
3,648,113
3,648,116
3,648,120
3,648,122
3,648,153
3,648,167
3,648,171
3,648,177
3,648,178
3,648,189
3,648,197
3,648,216
3,648,231
3,648,236
3,648,240
3,648,243
3,648,260
36 : 3,646,616
3,646,642
3,646,659
3,646,665
3,646,668
3,646,720
3,646,724
3,646,762
3,646,791
3,646,802
3,646,834
3,646,838
3,646,846
3,646,864
3,646,896

3,646,898
3,646,910
3,646,915
3,646,939
3,646,951
3,646,970
3,646,981
3,647,002
3,647,035
3,647,051
3,647,060
3,647,064
3,647,070
3,647,074
3,647,078
3,647,085
3,647,103
3,647,105
3,647,125
3,647,137
3,647,157
3,647,187
3,647,198
3,647,207
3,647,223
3,647,283
3,647,290
3,647,292
3,647,294
3,647,300
3,647,304
3,647,306
3,647,334
3,647,355
3,647,404
3,647,416
3,647,429
3,647,431
3,647,433
3,647,436
3,647,439
3,647,440
3,647,443
3,647,444
3,647,446
3,647,447
3,647,448
3,647,449
3,647,452
3,647,453
3,647,454
3,647,455
3,647,456
3,647,459
3,647,461
3,647,462
3,647,463
3,647,464
3,647,483
3,647,486
3,647,488
3,647,499
3,647,501
3,647,502
3,647,517
3,647,550
3,647,558
3,647,566
3,647,578
3,647,599
3,647,605
3,647,606
3,647,619
3,647,641
3,647,646
3,647,656
3,647,659
3,647,660
3,647,682
3,647,695
3,647,696
3,647,711
3,647,717
3,647,757
3,647,764
3,647,779
3,647,782
3,647,789
3,647,819
3,647,841
3,647,864
3,647,885
3,647,887
3,647,892
3,647,919
3,647,921
3,647,929
3,647,941
3,647,955
3,647,964
3,647,965
3,647,971
3,647,979
3,648,005
3,648,060
3,648,061

3,648,066
3,648,076
3,648,079
3,648,081
3,648,086
3,648,092
3,648,096
3,648,108
3,648,124
3,648,130
3,648,131
3,648,133
3,648,139
3,648,145
3,648,160
3,648,175
3,648,186
3,648,195
3,648,225
3,648,235
3,648,242
3,648,246
3,648,253
3,648,254
3,648,255
3,648,259
3,648,274
3,648,277
3,648,281
37 : 3,646,736
3,646,746
3,646,942
3,646,973
3,646,984
3,647,142
3,647,271
3,647,526
3,647,582
3,647,961
3,648,004
3,648,026
3,648,054
3,648,166
38 : 3,647,052
39 : 3,646,628
3,646,632
3,646,634
3,646,664
3,646,728
3,646,815
3,646,911
3,646,927
3,646,948
3,646,974
3,646,987
3,647,015
3,647,075
3,647,095
3,647,098
3,647,101
3,647,126
3,647,129
3,647,138
3,647,143
3,647,148
3,647,180
3,647,182
3,647,189
3,647,229
3,647,244
3,647,260
3,647,289
3,647,298
3,647,302
3,647,309
3,647,310
3,647,313
3,647,342
3,647,364
3,647,386
3,647,398
3,647,410
3,647,422
3,647,490
3,647,497
3,647,509
3,647,510
3,647,513
3,647,523
3,647,532
3,647,535
3,647,555
3,647,608
3,647,630
3,647,671
3,647,707
3,647,721
3,647,745
3,647,769
3,647,774
3,647,797
3,647,857
3,647,860
3,647,875
3,647,889
3,647,910

3,647,937
3,647,987
3,648,011
3,648,012
3,648,015
3,648,035
3,648,050
3,648,058
3,648,085
3,648,149
3,648,150
3,648,209
3,648,261
3,648,276
3,648,280
40 : 3,646,630
3,646,730
3,647,088
3,647,096
3,647,178
3,647,179
3,647,330
3,647,597
3,647,712
3,647,905
3,648,111
41 : 3,646,843
3,646,975
3,647,063
3,647,255
3,647,549
3,648,025
42 : 3,646,626
3,646,649
3,646,651
3,646,652
3,646,710
3,646,722
3,646,748
3,646,777
3,646,816

3,646,837
3,646,858
3,646,899
3,646,945
3,646,956
3,646,989
3,647,049
3,647,053
3,647,087
3,647,100
3,647,134
3,647,139
3,647,146
3,647,152
3,647,168
3,647,181
3,647,188
3,647,194
3,647,202
3,647,222
3,647,240
3,647,262
3,647,279
3,647,307
3,647,314
3,647,347
3,647,360
3,647,392
3,647,396
3,647,397
3,647,401
3,647,405
3,647,537
3,647,546
3,647,553
3,647,569
3,647,622
3,647,623
3,647,636
3,647,669
3,647,679

3,647,694
3,647,703
3,647,714
3,647,724
3,647,730
3,647,735
3,647,737
3,647,741
3,647,766
3,647,784
3,647,790
3,647,800
3,647,810
3,647,812
3,647,814
3,647,863
3,647,865
3,647,873
3,647,893
3,647,896
3,647,923
3,647,928
3,647,932
3,647,938
3,647,953
3,647,954
3,647,994
3,648,057
3,648,074
3,648,077
3,648,089
3,648,106
3,648,123
3,648,147
3,648,165
3,648,170
3,648,204

3,648,211
3,648,213
3,648,215
3,648,245
3,648,264
43 : 3,647,062
45 : 3,646,640
3,646,647
3,647,117
3,647,336
3,647,701
3,647,734
3,648,163
46 : 3,646,905
3,646,932
3,648,266
47 : 3,647,027
3,647,102
3,647,185
3,647,750
3,648,016
48 : 3,646,661
3,646,676
3,646,754
3,646,805
3,646,808
3,646,824
3,646,953
3,646,962
3,646,996
3,646,997
3,646,998
3,647,000
3,647,019
3,647,041
3,647,055
3,647,080
3,647,084
3,647,108
3,647,124
3,647,174

3,647,176
3,647,217
3,647,267
3,647,370
3,647,445
3,647,525
3,647,530
3,647,534
3,647,551
3,647,561
3,647,663
3,647,690
3,647,693
3,647,822
3,647,839
3,647,843
3,647,886
3,647,970
3,648,097
3,648,109
3,648,227
3,648,230
3,648,244
49 : 3,646,705
3,646,844
3,646,935
3,646,961
3,647,066
3,647,367
3,647,507
3,647,644
3,647,840
50 : 3,646,708
3,646,716
3,647,643
3,648,063
3,648,065
51 : 3,646,672
3,646,681
3,646,726

3,646,902
3,646,943
3,647,058
3,647,116
3,647,161
3,647,276
3,647,478
3,647,716
3,647,876
3,648,027
3,648,132
3,648,205
53 : 3,646,737
3,646,895
3,647,089
3,647,151
3,647,254
3,647,618
3,648,282
54 : 3,646,618
3,646,857
3,647,383
3,647,653
55 : 3,646,627
3,646,667
3,646,701
3,646,742
3,646,773
3,646,819
3,646,874
3,646,966
3,647,024
3,647,112
3,647,119
3,647,195
3,647,250
3,647,411
3,647,465
3,647,485
3,647,586
3,647,600
3,647,624
3,647,642
3,647,687
56 : 3,646,767
3,647,097

DESIGN PATENTS

6 : 223,050
223,070
223,085
223,087
223,092
223,094
223,096
223,099
12 : 223,077

223,088
223,093
223,097
13 : 223,095
17 : 223,047
223,056
223,063
223,064
223,067

223,068
223,076
19 : 223,049
21 : 223,072
223,073
223,074
223,075
24 : 223,086

25 : 223,078
26 : 223,089
223,090
34 : 223,057
223,058
223,059
223,060
223,061

223,079
223,082
36 : 223,052
223,054
223,055
223,066
223,080
223,081

223,098
39 : 223,051
223,053
223,071
223,083
40 : 223,048
223,062
223,065

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

10 : 896,002
10 : 896,009
896,013

27 : 896,003
36 : 896,007
896,011

896,017
896,018
896,019

896,020
39 : 896,004
42 : 896,001

896,005
896,016
47 : 896,008

896,010
896,014
48 : 896,015

U.S. GOVERNMENT PRINTING OFFICE: 0—1972

U. S. DEPARTMENT OF COMMERCE
Maurice H. Stans, *Secretary*

PATENT OFFICE
Robert Gottschalk, *Commissioner*